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ABSTRACT

Understanding the principles of sustainability and the interdependence of the environment, the economy, and social systems can help individuals learn to make the changes necessary to become effective stewards of natural resources and the environment. This document describes three broad policy recommendations as to how Americans can build concepts of sustainability into educational programs, and 12 strategic action plans for implementing those recommendations. The recommendations provide a framework for a flexible strategy and a toolbox of ideas which can be tailored to educational strategies reflective of individual and community needs. Chapters are as follows: (1) "A Program for Change"; (2) "Formal Education"; (3) "Nonformal Education"; (4) "Cross-Cutting Themes"; and (5) "Moving Forward." Core themes of the program include lifelong learning, interdisciplinary approaches, systems thinking, partnerships, multicultural perspectives, and empowerment. A key feature of the agenda is the Opportunities for Partnerships section at the conclusion of each chapter, which provides names, organizations, and resources to guide future steps. A sampling of programs and successful initiatives is presented to illustrate successful cooperative efforts and partnerships. (PVD)

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education for sustainability

an agenda for action

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This report is the product of work initiated at the "National Forum on Partnerships Supporting Education about the Environment," a demonstration project of the President's Council on Sustainable Development, held at the Presidio, San Francisco, California, in the fall of 1994.

Many private, nonprofit, and government sector organizations participated actively in developing the recommendations in this *Agenda for Action*. The recommendations and proposed initiatives do not necessarily reflect Administration policy or specific views of any single contributor.

education *for* sustainability

an agenda for action

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table of contents

education *for* sustainability:

an agenda for action

Introduction VII

Chapter 1 **A Program for Change** 1

Chapter 2 **Formal Education** 11
Action 1 *Green Schools: Models and Approaches* 12
Action 2 *Professional Development* 14
Action 3 *Essential Learnings* 16

Chapter 3 **Nonformal Education** 23
Action 4 *Public Awareness* 24
Action 5 *Sustainable Development Extension Network* 27
Action 6 *Community Visioning and Assessment* 29
Action 7 *Workforce Development* 33
Action 8 *Lifelong Learning* 36

Chapter 4 **Cross-cutting Themes** 45
Action 9 *State and Federal Policy Changes* 46
Action 10 *Technology and Information* 50
Action 11 *Multicultural Perspectives* 56
Action 12 *Global Perspectives* 59

Chapter 5 **Moving Forward** 67

Conclusion 77

Endnotes 79

Acknowledgments and Contributors 83

introduction

"It is our task in our time and in our generation to hand down undiminished to those who come after us, as was handed down to us by those who went before, the natural wealth and beauty which is ours."

John F. Kennedy, 1961

TODAY, EDUCATORS FACE A COMPELLING RESPONSIBILITY to serve society by fostering the transformations needed to set us on the path to sustainable development. The time has come to ensure that the concepts of education for sustainability—in the broadest sense—are discussed and woven into a framework upon which current and future educational policy is based.

As stated in *Agenda 21*, the document produced by the 1992 United Nations Conference on the Environment and Development, education is "critical for promoting sustainable development."[1] Understanding the principles of sustainability and the interdependence of the environment, the economy, and social systems can help us learn to make the changes necessary to become effective stewards of natural resources and the environment. Education for sustainability of which many other disciplines are indispensable components, will engage partners from all arenas—adult education, on-the-job training, other formal and nonformal education programs, and the media—to reach out to as many individuals as possible. Clearly, the time is right to engage in a dynamic process to educate not only children but all citizens about the economic and environmental realities of today's world.

The "National Forum on Partnerships Supporting Education about the Environment" met in October 1994. Participants developed a common and compelling vision: to broaden our concept of education to include sustainable development. Individuals from business and government, the educational community, and nongovernmental organizations (NGOs) came together to share common themes, ideas, and challenges related to education for sustainability. This event paved the way for a diverse group of stakeholders to begin a long-term consensus-building process.

This process of sharing ideas and forging new partnerships resulted in this document: *Education for Sustainability: An Agenda for Action*. The *Agenda* lays out a number of recommendations as to how we can build concepts of sustainability into our educational programs. Interwoven with these recommendations are specific initiatives, and opportunities for interested individuals from all sectors to become partners, leaders, or participants in activities that educate for sustainability. The recommendations provide a framework for a flexible strategy and a toolbox of ideas, which can be tailored to educational strategies reflective of individual and community needs. The hope is that, through a variety of approaches, education for sustainability can involve broader audiences than it has in the past.

A key feature of the *Agenda* is the "Opportunities for Partnerships" section at the conclusion of each chapter. This section lists organizations mentioned in the chapter and is a vital reference tool in that it provides readers with names, organizations, and resources to guide next steps. A sampling of programs and successful initiatives is presented to illustrate cooperative efforts and partnerships that are working. The *Agenda* is designed to serve as a model for projects, programs, and opportunities to encourage collaboration among a diverse set of partners.

Hundreds of individuals from across the country contributed to the formation of this *Agenda*. Its implementation will require diverse talents to further develop the ideas presented in this document. Working together, we can make education for sustainability a critical part of a lifelong learning process.

CHAPTER ONE

a program for change

What Is "EDUCATION FOR SUSTAINABILITY"?

Education for sustainability is a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, and commitment to engage in responsible individual and cooperative actions. These actions will help ensure an environmentally sound and economically prosperous future.

SUSTAINABLE DEVELOPMENT, AS DEFINED BY THE BRUNDTLAND COMMISSION in 1987, is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[2] In a sustainable society, environmental protection and economic objectives belong to a common framework. The President's Council on Sustainable Development's definition of sustainable development has been broadened to include social equity.[3] In a sustainable world, environmental protection, economic objectives, and social justice should be linked in harmony.

Many educators are helping society achieve sustainability by teaching the three "e's"—environment, economics, and equity—along with the traditional three "r's"—reading, writing, and arithmetic. In so doing, they are fostering awareness of sustainability among individuals, communities, institutions, and governments. In coming decades, education for sustainability has the potential to serve as a tool for building stronger bridges between the classroom and business, and between schools and communities.

In this document, the term education for sustainability is used as an umbrella term.[4] As such, it may embrace components from traditional disciplines such as civics, science, political science, geography, and others.

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Historically, various conferences and organizations have offered definitions of environmental education.[5] Under some of these definitions, environmental education includes the economic, environmental, and social dimensions contained in the concept of education for sustainability. A working definition of education for sustainability is provided here (see previous page) as a contribution to the national dialogue.

As attention to the concept of sustainability escalates domestically and abroad, our efforts must continue to bring all stakeholders together in its pursuit. The roles of citizens, communities, industry, and government in achieving the goals outlined in recent national reports on sustainability suggest that efforts should be increased to ensure that thoughtful, comprehensive planning is promoted by the formal and nonformal education community.

These efforts should focus attention on the delivery systems used to achieve these goals. A key question is, "Have educational efforts produced an informed citizenry, an environmentally and scientifically literate citizenry, and a cadre of technical-policy-managerial professionals proficient in guiding our nation's industries, communities, and governments?"

Although previous environmental education efforts have resulted in successes, much remains to be done. Many people, for example, still confuse the issue of global warming with that of depletion of the ozone layer. A study by Carnegie-Mellon University in 1994 revealed that even well-educated citizens believe that climate change would cause increased cases of skin cancer and that a personal response should be to give up aerosol sprays.[6] Similarly, a 1992 national opinion survey conducted by Peter D. Hart Research Associates indicated that only one percent of those surveyed listed endangered species as a serious environmental problem.[7] Only one in five had heard of the loss of biological diversity. In 1991 and 1992, a pair of surveys by the Roper Organization tested Americans' "green point average."[8] The average adult and teenager were able to answer fewer than four out of 10 questions correctly.

These surveys reveal an important need for a citizenry with increased knowledge of the environment and the integrative skills needed for understanding the interdependent relationships between the environment and the economy. Responsible action by all citizens, based on the best available data, requires a targeted effort to improve the ways that we use available information. Education is key in responding to this need.

If sustainability is to be achieved, educators should take a leadership role, breaking new ground to prepare society for an age of accelerating change in a world of increasingly diverse and growing populations, an expanding economy, and changing global environment.

Developing a Framework

In the fall of 1994, the National Science and Technology Council convened a forum for national leaders from education, the business sector, government, and nongovernmental organizations to explore strategies for building effective partnerships to support education for sustainability. The "National Forum on Partnerships Supporting Education about the Environment," held at the Presidio in San Francisco, was co-chaired by John H. Gibbons, Assistant to the President for Science and Technology; Madeleine Kunin, Deputy Secretary of the U.S. Department of Education; Keith Wheeler, Executive Director, Global Rivers Environmental Education Network (GREEN); and Ralph Ponce de Leon, Corporate Vice President of Motorola, Inc. More than 100 individuals with a broad range of expertise came together to work on this issue, including corporate leaders, university administrators, professionals in the field of environmental education, state and federal officials, as well as teachers, scientists, and students.

Together, they explored collective and individual roles, common visions, and opportunities for collaboration. One major objective of the national forum focused on the development of a blueprint supporting education for sustainability. The outcome is the present document, *Education for Sustainability: An Agenda for Action*. Its purpose is to lay out a plan of action to integrate education for sustainability into broader educational curricula. Business, government, and nongovernmental organizations working in consort can help in this process, in particular, by establishing partnerships to facilitate cooperative interrelationships among formal and nonformal educational efforts.

In a parallel process, the President's Council on Sustainable Development (PCSD) brought together leaders from industry, government, and environmental, labor, and civil rights organizations to develop policy recommendations to enhance the sustainability of our nation's economic, environmental, and social future. The 25-member council, which was created by an executive order in June 1993, consists of five cabinet secretaries, chief executive officers of businesses, and executive directors of nongovernmental organizations.

The work of Phase I of the Council was accomplished through eight task forces: Principles, Goals, and Definitions; Public Linkage, Dialogue, and Education; Eco-Efficiency; Energy and Transportation; Natural Resources; Population and Consumption; Sustainable Agriculture; and Sustainable Communities. The Public Linkage Task Force's Education Working Group, also chaired by Madeleine Kunin, developed a policy framework to enable all learners to become educated for sustainability.

In March 1996, the report of the President's Council on Sustainable Development, *Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future*, was delivered to President Clinton. As the Council enters Phase II, its focus will shift toward implementation of its policy recommendations. The *Agenda for Action* provides a framework for implementing the Council's education recommendations.

A Course for Action

From these two parallel processes (National Forum and PCSD) came a clear recognition that the job of integrating the principles of sustainability into our nation's educational system requires skills and actions different from those currently contributed by education, government, business, or nonprofit organizations. Our hope is that *An Agenda for Action* will cast a broad enough net to encompass all stakeholders. We can succeed only if all groups are working together.

This *Agenda for Action* charts a clear course for a new spirit of collaboration, with emphasis pointing most noticeably toward the environmental aspects of sustainability. Such a course will require the help of many disciplines focusing on the interconnections among the natural and built environment, and the economic and political forces that influence the world around us. These forces are fluid and subject to changing conditions. Sustainable development is therefore a process rather than a fixed goal.

Our national vision of sustainability will develop and mature in the future as environmental, economic, and social forces undergo change. The philosophical principle that sustainability is a process will need to be reaffirmed continually as our nation advances along the path to sustainability.

Similarly, the dialogues during the meetings of the National Forum and PCSD led to a recognition that successful efforts for implementing education for sustainability depend on six core themes. Collectively, these themes outline a course of action to educate for sustainability. They are (1) lifelong learning, (2) interdisciplinary approaches, (3) systems thinking, (4) partnerships, (5) multicultural perspectives, and (6) empowerment.

What is LIFELONG LEARNING?

The phrase "lifelong learning" is used in this document as an umbrella term that bridges formal and nonformal education. It is employed in this broad sense to emphasize the integrated nature of all education, throughout one's life. All forms of formal and nonformal education are part of the seamless process of lifelong learning.

Lifelong Learning

Education is a process that is—or should be—ongoing throughout one's lifetime. As the Ontario Teachers Foundation has stated, learning is not "a prerequisite to living but is its accompaniment."[9] Lifelong learning is the first major theme of *An Agenda for Action*. Traditionally defined, "lifelong learning" refers to nonformal education that occurs after one's formal schooling has been completed. In this document, we use "lifelong learning" to encompass formal education as well as nonformal learning throughout one's lifetime. One reason for broadening the term is that education begins in the home, and this early learning does not find a comfortable resting place in the traditional definition of lifelong learning. But the main reason is that learning is a seamless process that occurs in myriad nonformal and informal ways during an individual's lifetime.

Interdisciplinary Approaches

Education for sustainability requires an understanding of the interdependence and interconnections of humans and the environment. It's elements include knowledge of global socio-geopolitical disciplines, biological and physical sciences, and human socio-economic systems. For example, education for sustainability will prepare policymakers for merging economics and the natural sciences with other disciplines when developing environmental policy.

Environmental issues traverse studies of the natural sciences (biology, earth sciences), social studies (economics, anthropology, geography, and history), and the humanities (philosophy, the arts, ethics, and literature). Many schools have begun integrating environmental examples into some of their coursework, thereby fostering enthusiasm for science and other disciplines. Infusing the concept of sustainable development throughout K-12 and undergraduate curricula can help make classroom learning relevant.

Ideally, disciplinary courses with social, economic, or environmental content should be accompanied by interdisciplinary subject matter on sustainability, which draws from a number of content disciplines. To the extent possible, educational curricula and pedagogy should reflect the interconnections among disciplines that are central to sustainable development. The benefit of this approach is that sustainability is an ideal organizing theme ideal for encouraging integrative thinking. Learning about sustainability necessitates breaking down the walls between disciplines, perhaps by focusing on a single real-world issue addressed from various perspectives. To support this kind of experience, existing education standards may need to be revisited to embrace the major elements of sustainability.

Whatever the approach, the process used and resources employed to integrate education for sustainability across the curriculum will remain a local issue to be

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addressed and continually assessed by communities, local and regional programs, and their respective stakeholders. Course materials with regionally specific, hands-on examples will have to be developed, and teachers will benefit from training and practical assistance.

Equally important, interdisciplinary approaches should be encouraged as part of nonformal educational experiences. "Nonformal education" is used by educators to indicate those forms of learning acquired in informal contexts, such as the media, workplaces, and community activities. All learners—both children and adults—need to see the connections among discrete bits of knowledge gained on a daily basis if they are to respond to the challenges posed by a nation moving toward sustainability.

Systems Thinking

Educators generally accept that the first goal of learning is to impart knowledge and the second is to teach skills such as problem solving, conflict resolution, consensus building, information management, interpersonal expression, and critical and creative thinking. Education encompassing the concepts of sustainability offers an exemplary vehicle for developing and exercising many of these skills which are increasingly being sought by employers. Increasingly, these are the skills that employers are seeking in a world of complex problems requiring integrative solutions.

In *Technology for a Sustainable Future*, the National Science and Technology Council noted, "Given the interwoven nature of environmental problems, systems approaches are essential if we are to attain sustainable development."[10] Thinking that synthesizes and evaluates linkages among disciplines is needed if we are to understand the global implications of environmental and economic decisions. As socio-economic problems and environmental issues become increasingly complex, advanced technologies can serve as a tool helping the human mind synthesize and integrate mountains of data.

The importance of systems thinking cannot be ignored. Any concept—including sustainability—should be open to informed debate and sustainable development should not be taught as an ideology or as a goal, but rather as an ongoing process: not as a set of irrevocable answers, but as a way of continually asking better questions.

Partnerships

In addition to bridging disciplines, education for sustainability will mean reaching beyond schools to involve businesses and individuals with specialized expertise throughout the community. In the 21st century, learning about economic and social development as well as the built environment and natural resources will be the collective responsibility of public and private institutions, communities, businesses, and individual citizens worldwide. Partnerships among governments, educational institutions (from K-12 schools to community colleges and universities), industries, nongovernmental organizations, and community groups are increasingly important.

Increasingly, businesses require a workforce that is both environmentally literate and skilled in interdisciplinary systems approaches to solving problems. Businesses can support formal education by participating in classwork as mentors, by offering internships, by providing employees with opportunities for advanced training, and by employing business sites as classrooms. Most importantly, the business community and the education profession can engage in ongoing dialogue about common goals and how best to achieve them. Federal, state, and local governments can support educational activities in the public and private sectors and build intergovernmental alliances to advance education and training by supporting educational activities. Educational institutions should seek ways to collaborate with nongovernmental organizations and industry to advance common objectives.

Multicultural Perspectives

To be effective in reaching people across the country and around the world with a message that is relevant and meaningful, education for sustainability must encompass an appreciation of diverse cultural perspectives. This requires that the content of educational materials reflect divergent cultural approaches to sustainability. Educational materials and programs should be made accessible to all interested communities.

Furthermore, educational programs should be rooted in the actual experiences of people in their own communities. These programs should not assume a common understanding of sustainability's political and social context.

Finally, young people from diverse cultural backgrounds must be provided with the training and access necessary to pursue environmental and scientific careers. Only then will the workforce charged with implementing sustainability begin to reflect the rich diversity of U.S. society and the world at large.

Empowerment

Education is generally agreed to be the most effective way to impart knowledge and skills that can be applied outside the classroom in everyday life. The desired outcome is informed citizens who are prepared to participate responsibly in a sustainable society. Students can be empowered by giving their voice to new ideas and through action, such as voluntary community service, which is, itself, an educational tool. Nonformal education programs also provide good opportunities for learners to act individually and collectively by providing the knowledge and skills necessary to evaluate and discuss complex issues. Education for sustainability can provide a vehicle for engendering responsible citizenship, utilizing a variety of instructional models and guidelines that have been long accepted in the field of education.[11]

Sharing experiences about successful actions that are engendered by education for sustainability in its formal and nonformal modes will accelerate the transition to sustainability. Information about existing models of sustainability can be disseminated through the media, multimedia technologies, information clearinghouses, and other means, both nationally and internationally.

CORE THEMES

In summary, *Education for Sustainability: An Agenda for Action* focuses on six themes:

1. Lifelong learning

The potential for learning about sustainability throughout one's life exists both within formal and nonformal educational settings.

2. Interdisciplinary approaches

Education for sustainability provides a unique theme to integrate content and issues across disciplines and curricula.

3. Systems thinking

Learning about sustainability offers an opportunity to develop and exercise integrated systems approaches.

4. Partnerships

Partnerships forged between educational institutions and the broader community are key to advancing education for sustainability.

5. Multicultural perspectives

Achieving sustainability is dependent upon an understanding of diverse cultural perspectives and approaches to problem solving.

6. Empowerment

Lifelong learning, interdisciplinary approaches, systems thinking, partnerships, and multicultural perspectives empower individuals and institutions to contribute to sustainability.

These underlying themes lay the foundation for a set of strategic actions and initiatives outlined in the coming chapters. Collectively, these actions and initiatives form the heart of *Education for Sustainability: An Agenda for Action*.

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Lessons Learned

One lesson learned from the first 25 years of educational efforts aimed at addressing education about the environment is that there is an opportunity for improved collaboration. Individual roles for each stakeholder are important, but collective action is essential to reduce duplication and leverage scarce resources. All sectors of society should work toward complimentary goals so that education for sustainability can achieve its full potential. Educators, the private sector, government, and nongovernmental organizations should evaluate their respective strengths and address how to better coordinate limited resources. Awareness of shared needs and common ground is the first step.

Educators have identified a number of obstacles that are impeding the integration of information about the environment and sustainability in formal learning settings. One obstacle is that the interdisciplinary content of education for sustainability does not easily fit into a discipline-oriented educational process. Other obstacles are the lack of general agreement among professional educators that education for sustainability is a priority and there is insufficient professional preparation for teaching the core content of sustainability issues. Until recently, there has been a lack of consensus on an effective system for evaluating programs and materials in order to ensure quality; however, the North American Association for Environmental Education (NAAEE) has developed material standards for evaluating environmental education curricula.

New approaches to learning may offer significant benefits. New approaches will be more readily accepted if the benefits of teaching education for sustainability are understood. Professional training is needed to enable teachers to introduce new curricula and methods into the classroom. Still another challenge for educators is finding ways to incorporate diverse cultural perspectives. Administrators in universities and colleges should consider adopting sustainable procurement practices and persuade funders to support interdisciplinary research and teaching, which is increasingly needed for finding sustainable solutions.

Nongovernmental organizations frequently are faced with the challenge of trying to persuade foundations, businesses, and the public to sustain support for effective programs over an extended period of time, rather than changing focus annually. Many nonprofit entities, both small and large, have learned that collaborative, synergistic approaches strengthen programmatic initiatives and contribute to longevity and the much-needed financial resource base.

Business leaders can contribute by working with educators to set priorities to ensure that their support for educational programs is allocated to those that are effective, produce measurable results, and survive long enough to have a real impact. At the same time, companies can participate in mentoring programs and internships. In the past, the business sector has made a number of indirect contributions to education for sustainability, such as developing innovative systems-oriented approaches to problem solving. In addition to these kinds of contributions, business can finance training for their workers in the use of sustainable technologies and develop innovative approaches to protect the environment and ensure economic prosperity.

While there are many successful education efforts underway across the federal government, there is an opportunity for officials to address the lack of effective coordination among the educational activities of individual agencies. Duplication of efforts among agencies as well as a steady decline in fiscal support limit efforts to advance education for sustainability.

In addition, government, the scientific community, educators, and the media should ensure that information provided to the public is accurate, useful and clearly presented. The vehicles by which information is furnished—internet, the media, publications—are continually changing and require ongoing training, skill acquisition, and upgrades in equipment.

The initiatives recommended in *An Agenda for Action* are intended to address these obstacles and encourage each sector to act individually as well as collectively.

A Leader in Education and the Environment: Bill Stapp

A number of educators have played pivotal roles in the history of environmental education and sustainability. One name in particular appears at many of the milestones. In 1968, Dr. Bill Stapp worked with graduate students at the University of Michigan to develop the first formal definition of the term "*environmental education*." Stapp wrote, "Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and "its associated problems, aware of how to help solve these problems, and motivated to work toward their solution."[12]

The next milestones were the international Belgrade (1975) and Tbilisi (1977) conferences. Stapp spearheaded these conferences in his role as the first director of environmental education for the U.N. Educational, Scientific, and Cultural Organization (UNESCO). These international conferences focused on a goal of improving all ecological relationships, including the relationship of humanity with nature and people with each other.

Later in Stapp's career he began focusing on issues of environmental justice. While focusing on water quality monitoring at a watershed level, Stapp noted that most rivers start near rural communities that are demographically white, flow through mostly white suburbs, and end up passing through inner cities populated by many low-income, minority, and ethnic communities.

At yet another milestone, Stapp founded the Global Rivers Environmental Education Network (GREEN). Today, GREEN links learners in 140 nations. Education for sustainability owes much of its present energy to far-sighted leaders such as Bill Stapp.

In This Report

Formal and nonformal modes of education are integral components of a lifelong learning process. In the coming chapters, formal and nonformal education are discussed as discrete approaches for the purposes of analysis. Educational processes and the infrastructure on which they depend are complex systems.; however, *An Agenda for Action* uses a linear method of description where the ideal would be to mirror the web of interrelationships that characterizes the real world.

An Agenda for Action proposes three broad policy recommendations and twelve strategic actions for implementing those recommendations. The proposed actions are developed further through a number of specific initiatives. The initiatives represent programs which are in need of support, being planned or underway. Success stories are offered as models for illustration purposes and for potential replication. Ideas for individual and collective participation by each sector are explored. These ideas offer a rich pool of opportunities for partnerships to advance education for sustainability.

Global Rivers Environmental Education Network (GREEN)

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GREEN is an innovative, action-oriented approach to education, based on an interdisciplinary watershed education model. GREEN's mission is to improve education through a global network that promotes watershed sustainability. Its goals include incorporating all areas of the curriculum into an integrated watershed education program that links education, government, nongovernmental organizations and other members of the community working with schools and communities to provide information to develop watershed education programs.

President's Council on Sustainable Development (PCSD)

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The PCSD was established by President Clinton in 1993—a unique mix of 25 individuals representing business, labor, environmental, civil rights, tribal, and local leaders along with members of the President's Cabinet. The PCSD's mission is to develop a "national sustainable development action strategy that will foster economic vitality while protecting our natural and cultural resources." The PCSD produced a report that outlines the first steps the nation needs to take in order to move toward a more sustainable future.

United Nations Educational, Scientific and Cultural Organization (UNESCO)

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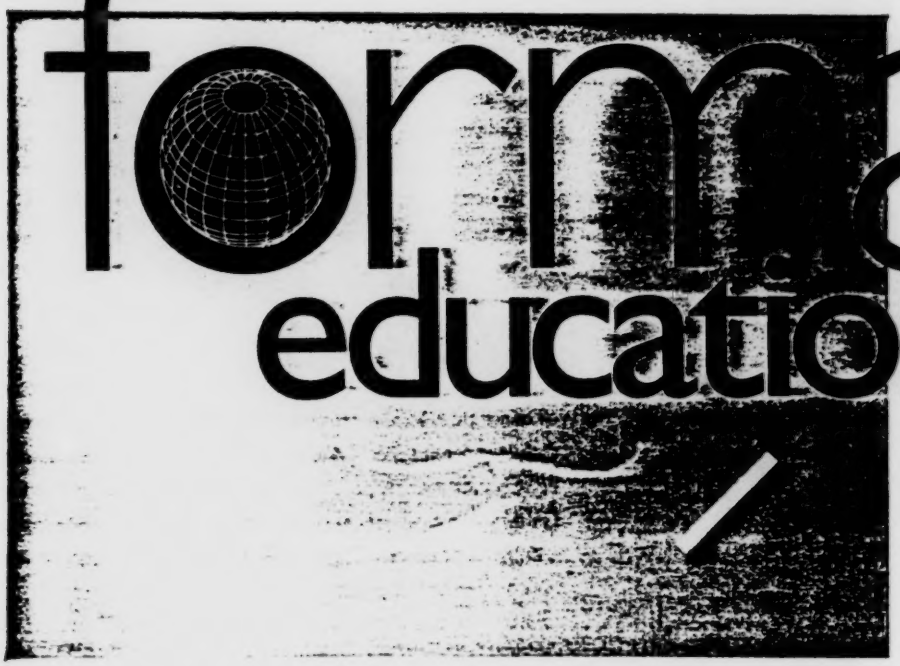
UNESCO promotes collaboration among nations through education, science, culture, and communication in order to advance universal respect for justice, law, and the human rights and fundamental freedoms that are affirmed for the peoples of the world by the Charter of the United Nations.

CHAPTER TWO

formal education



"One result [of formal education] is that students graduate without knowing how to think in whole systems, how to find connections, how to ask big questions, and how to separate the trivial from the important. Now more than ever, however, we need people who think broadly and who understand systems, connections, patterns, and root causes."

David Orr
Earth in Mind

EDUCATION AND THE INFRASTRUCTURE ON WHICH IT DEPENDS SHOULD reflect the rest of the world and be holistic systems. This chapter and the following one focus on formal and nonformal education as distinct activities, but only for the purposes of study and analysis. Ultimately, education is a seamless lifelong process. Similarly, all forms of education must focus on interconnections: the linkages found in nature and those connecting economic systems, environment, and society.

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POLICY RECOMMENDATION 1

Formal Education

Ensure that the interconnections between the environment, economy, and social structures become an integral part of formal education, starting with kindergarten and continuing through elementary and secondary school and on through training at the college, university, and professional levels.

Action 1: Green Schools

Design and support opportunities for integrating the concepts and principles of education for sustainability into formal educational programs from early grade school through the university level.

Finding

Sustainable development requires much broader public awareness and understanding of the natural resource and economic challenges facing the world in the 21st century. The 3,000 institutions of higher education in the United States are significant but largely overlooked leverage points in the transition to a sustainable world. Not only do they prepare students who will become teachers and leaders in the educational field, they also educate the students who will become leaders in other fields. These institutions also influence their alumni, many of whom constitute our nation's current leaders.

In primary research published by the Worldwatch Institute, a survey was conducted of more than 715 universities that are members of the American Association of Colleges for Teacher Education. The survey revealed that only 13 percent of the universities that responded offer a required course in environmental education. Generally, interdisciplinary courses with an environmental focus are increasing in colleges and universities, but they remain under-utilized. According to the United Nations Environmental, Scientific and Cultural Organization (UNESCO) and the United Nations Environment Programme (UNEP), only about 7 percent of institutions of higher education offer degrees in the environmental sciences.

Faculty members can play a strong role in education, research, policy development, information exchange, and community outreach. They can contribute new ideas, engage in bold experimentation, as well as contribute to new knowledge. Institutions of higher learning should place a greater emphasis on interdisciplinary, systemic, and strategic ways of thinking.

Students, parents, alumnae, prospective employers, organizations that fund research and education (government, industry, and foundations), and the public are all consumers, clients, or supporters of education's services. Individually, they have varying degrees of influence on academic direction and programs, but collectively they have great potential to encourage innovation in education.

INITIATIVE 1.1

State boards of education should be encouraged to consider the importance of education for sustainability and to include it in licensure, standards, and guidelines for program approval developed at the state level for K-12 teachers and principals.

In today's press for educational reform, environmental education overlaps with other priorities, such as the education of diverse learners, use of integrated or comprehensive services, incorporation of advanced technologies in the classroom and parent involvement. Therefore, education for sustainability presents an opportunity to meet more goals of education reform.

There is not one state where environmental education or education for sustainability programming has been fully incorporated into formal education institutions.[13] The states that have moved toward comprehensive programs in environmental education have formed partnerships and secured support leading to the adoption of legislative mandates and other formal guidelines. Growing public support for literacy on sustainability will serve as a catalyst and incentive to encourage educational leaders to invest in the infrastructure needed to insure the infusion of accurate, timely content on sustainability in K-12 curricula.

Lessons Learned in Washington State

"Environmental education is a powerful tool for school improvement," reports Marcia Siam Wiley, program supervisor for the Model Links Program in the State of Washington. In 1993, a cadre of Washington public schools initiated an effort to place environmental education programs at the center of school improvement efforts. Together, this network of schools has moved steadily forward while documenting what is being learned.

Strategies pivotal to the program's success include the following:

- Start small by working at a project scale that is realistic; not all teachers and classes need to be involved initially.
- Focus on using education for sustainability to improve instruction and enhance what is already being done.
- Explaining why you are doing what you are doing, and discuss the program with parents, teachers, feeder schools, the school board, and administrators.
- Invite community participation in specific ways; let others know what is needed, and in return, what the school can offer.
- Allow time to organize information and assess what is and is not working.
- Recognize that change takes time: "go slow to go fast."
- Involve key players, such as librarians, educational assistants, and community experts in curriculum design.

These and other lessons learned are described in on-line process portfolios.

"Each year we see more clearly the pivotal role education plays in preparing our society for the challenges of today and of the future. Matters related to the environment are at the forefront of these challenges."

Judith Billings
Washington State Superintendent of Public Instruction

INITIATIVE 1.2

Implement partnerships to help institutions of higher education achieve the transition to education for sustainability.

Participants from all sectors—education, government, NGOs, and business—should explore the intellectual, institutional, and operational changes that are needed to make the shift to sustainability. Implementing the changes will require innovative and cost-effective and approaches to leverage additional resources. University presidents, deans, faculty members, students, as well as individuals outside academia, should participate in identifying strategies and building partnerships to pursue them.

INITIATIVE 1.3

Support exemplary models of "green campuses," that is, operational practices that engage the learning community in planning and decision-making for achieving sustainable educational environments.

Interest in providing programs of study that emphasize education for sustainability is growing at schools and universities across the United States. Demand for these institutions to reduce the environmental impact of their own operations is increasing as well. Initiatives in this area can encourage successful efforts by school administrators, building managers, teachers, faculty members, and students by helping publicize university projects as models of sustainability that could be replicated by communities, businesses, and homeowners. One approach is the Clinton Administration's proposed School Construction Initiative, which is a $5 billion dollar school construction and renovation program and could potentially offer opportunities for energy efficiency and other sustainable practices.

A useful resource for models is a 1995 report by the National Wildlife Federation, *Ecodemia*, a compendium of success stories achieved by colleges and universities that have launched creative management practices.[14] This guide highlights the numerous partnerships on campuses across America that have resulted in economic and environmental victories.

There are additional examples. The U.S. Environmental Protection Agency Administrator, Carol Browner, and The George Washington University President, Stephen Joel Trachtenberg, signed a landmark public-private partnership on December 12, 1994. Under that agreement, The George Washington University and EPA formed a partnership to enhance leadership and stewardship in environmental management and sustainable development—the GreenU Initiative.

The Center for Environmental Education, a nongovernmental organization published, *Blueprint for a Green School*,[15] which addresses school operations and adds a wealth of ideas aimed at curricula and instruction. Many similar resources are available, paving the way for educational institutions to emerge as community leaders and exemplars of innovative environmental and economic practices.

Action 2: Professional Development

Encourage the incorporation of education for sustainability in pre-service and in-service professional development activities.

Finding

Professional development is the bridge between the present and the future as educators work to meet the new challenges of guiding students in achieving higher standards of learning. Understandably, the rising interest in environmental literacy and education for sustainability has created expectations that timely, accurate content will be taught.

Lack of attention to preparation for teaching environmental literacy and sustainability results in missed opportunities to incorporate these basics into the curricula of educational programs. Most educators recognize a sense of responsibility for preparing students to live and work in a global society. The question remains as to how to deliver adequate training and staff development.

The nation's K-12 public and private schools employ 2.8 million teachers today. At least 3.3 million teachers will be needed by the year 2003.[16] Yet the implications of preparing new teachers and

those already in the profession for teaching the principles of sustainability have not been given serious consideration. Making the connection between the education of teachers and the environmental literacy of students as an outcome of education is a key step toward sustainable development.

Helping teachers incorporate education for sustainability effectively into the learning process not only will advance scientific and environmental literacy, but also will assist students in developing critical thinking skills.

INITIATIVE 2.1

Leadership by federal and state governments, institutions of higher education, professional societies, and the private and nonprofit sectors is needed in support of pre-service professional development in education for sustainability.

Most new teachers graduate from teacher preparation institutions with limited knowledge of education for sustainability and ways that it can be incorporated into their teaching. In fact, most university professors who offer core courses in educational methodology have not themselves had the preparation necessary to infuse sustainability concepts into their courses and the internships they oversee.

The many professional organizations serving teachers, teachers' unions, and college and university accreditation programs can contribute to the leadership needed to focus college and university teacher training programs on incorporating sustainability concepts. In addition, initiatives funded by the private sector should serve as examples for ensuring adequate pre-service training. In particular, the private sector could exert influence through its investments in university partnership programs related to teacher development.

The need for pre-service teacher training in environmental curricula can hardly be overemphasized. Substantial background and expertise, along with necessary resources, is needed to impart skills and attitudes effectively. According to a recent study, the majority of teachers feel that they are not prepared for conveying the broad spectrum of issues and content related to the environment.[17]

Whether in elementary, middle, or high school classes, infusion of the concepts and skills of economics, natural resources, and the global environment into existing curricula, rather than a separate class, has proved to be the most frequently selected approach to teaching the concepts of sustainability.

In-service training will be most effective when a school district's recommendations regarding "scope and sequence" preparation

Oberlin College

Environmental Design Center

As part of the Environmental Studies Program at Oberlin College in Ohio, students, faculty members, and outside experts are working together to design a new building on campus.

The building will be a state-of-the-art structure aiming at achieving zero emissions and advanced energy and materials efficiency, and using non-toxic and recycled materials, ecological waste water systems, applications of solar and other renewable energy technologies, and ecological landscaping.

Oberlin's new Environmental Center is intended to be a hub for interdisciplinary education, research, and action on the complex array of problems and opportunities facing humankind in the 21st century. It is hoped that this project will influence other colleges and universities that are building or renovating structures. The aim is to reduce environmental impacts and a substantial portion of the billions of dollars spent annually to operate physical facilities.

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includes, but are not limited to: (1) learning environmental concepts, (2) acquiring educational methods and professional skills, and (3) receiving guidance during initial classroom applications. In addition, a way to measure student progress is essential.

INITIATIVE 2.2

Cooperative efforts and partnerships are necessary to insure that all in-service teachers receive training and support in classroom applications of a range of education materials addressing the concept of sustainability.

Empowering teachers to create opportunities that will enable all learners to be educated for sustainability is the challenge for successful professional development. In-service training requires the cooperation of state departments of education, institutions of higher education, leaders in school districts, professional education organizations, private and nonprofit sectors, and most importantly, community members. Opportunities for professional growth must respond to real needs faced by teachers every day. Acquisition of the resources necessary to plan and implement responsive opportunities in educational settings, whether they are rural or urban, first-grade science, or 12th-grade economics. The U.S. EPA has funded the Environmental Education and Training Partnerships which brings 18 nonprofit organizations and universities together to deliver in-service training to more than 35,000 teachers.

States should be encouraged to provide incentives to align teacher licensing and certification standards to include education about sustainability. Partnerships among those involved in the development of effective professional standards are essential.

Action 3: Essential Learnings

Identify and formalize a set of essential skills and knowledge for all students that reflect a basic understanding of the interrelationships among environmental, economic, and social equity issues.

Finding

Education about the environment and sustainability should be an integral part of every student's schooling. When infused throughout the curriculum, education for sustainability supports the high standards set by the traditional disciplines. Currently, however, the advancement of environmental education nationwide is inconsistent, achieving a high profile where the state—or even individual teachers—have made a commitment to it and being practiced at a minimal level or not at all elsewhere.

Education about the environment and sustainability, as recognized by leading practitioners, goes well beyond the biological and physical sciences to encompass economic, political, and social systems that draw on and impact the natural and built environments. Environmental and sustainability education deal with these systems at the local, national, and global levels. Good education is based on inquiry, critical analysis, and presentation of a variety of perspectives.

Because education about the environment and sustainability is interdisciplinary, previous efforts to define discipline-centered standards have not fully captured it essence. Although largely based in natural science, environmental education touches on geography, economics, history, and civics. Standards for each of these disciplines have environmental content, yet there is no umbrella document that describes the integration of these disciplinary standards to create curricula that will produce environmentally literate citizens.

Currently, educators at the state and district levels are struggling to define new statewide learning standards based on the voluntary national standards certified under the Goals 2000 program. Educators have called for a set of essential learnings in environmental education that could be integrated into these standards. Funders of environmental and global education projects also have expressed a need for a set of peer-reviewed, widely agreed-upon learning standards that could guide them in assessing programs. Additionally, many states have adopted mandates to teach environmental education. However, without a generally accepted framework of skills and concepts, these mandates can be difficult to implement and evaluate.

A Story of Success

Wisconsin has trained hundreds of environmental education leaders, who are having an impact on thousands of students throughout the state. The program's success is attributable to partnerships among public and private entities committed to a systematic in-service program. According to Rick Wilke, associate dean at the University of Wisconsin-Stevens Point, "The critical element is cooperation among agency, university, school district, and nonformal educators in achieving common goals." Wilke believes other states can be just as successful. The following chronology highlights Wisconsin's key accomplishments:

1988 An environmental education center is created to coordinate in-service teacher training.

1989 Four sequential in-service courses are designed to be offered throughout the state by 25 adjunct faculty from the University of Wisconsin-Stevens Point.

1990 A National Science Foundation grant is received to kick off the program, and legislation is enacted to create the Wisconsin Center for Environmental Education at the university.

1991 An initial group of 600 teachers from around the state complete the courses, and research on teaching practices in environmental education in Wisconsin is initiated.

1992 A network for disseminating information to teachers and coordinating planning is established, and teacher liaisons are recruited in approximately 1,000 schools. A master's degree program focused on leadership in environmental education is launched.

1993 Results from the 1991 research are used to guide planning. A three-year National Science Foundation grant is secured to support the statewide courses and master's degree program. An initial 25 teachers enroll in the master's program.

1994 Another 600 teachers complete the in-service courses, and an additional 25 educators enroll in the master's degree program. Research is undertaken to determine the effectiveness of the courses.

1995 Plans are developed for sustaining the statewide courses and master's degree program once the National Science Foundation funding ends.

1996 More than 70 teachers pursue master's degrees, and 22 statewide courses are offered. Tuition revenue supports continuation of the courses, and research continues to ascertain changes in teaching practices. Thirty-two graduates from the master's program are working throughout the state as environmental education leaders.

"We need to bring our educational programs a new ethic. Man is capable of care as much as he is of destruction.... If we can make conservation a national cause, we can raise generations who will learn that the earth itself is sacred.... Once that ethic is taught, beginning in our kindergartens, no more American wilderness bowls will be broken and turned to dust."

William O. Douglas, 1961

INITIATIVE 3.1

The North American Association for Environmental Education and its partners are following a critique-and-consensus process for development of learning standards in environmental education that are consistent with the recommendations of the National Education Goals Panel.

Standards provide focus and direction. By defining the content, these standards help facilitate the provision of quality education that is equitable, coherent, and efficient. The North American Association for Environmental Education (NAAEE), working with the U.S. Environmental Protection Agency, the World Resources Institute, Illinois University and others have begun a process to develop a set of learning standards that can be used at the state, district, or school levels to develop curricular benchmarks for environmental education in the 4th, 8th, and 12th grades. The process of developing performance standards involves educators in the fields of science, social studies, geography, and environmental education; representatives from environmental organizations, business, and communities; and students.

The standards will stress the importance of scientific understanding and inquiry as well as critical thinking skills and the ability to express conclusions. These standards also will address the need for students to be involved in activities that promote and demonstrate responsible citizenship.

The development of environmental education standards is intended to be an open process, and opportunities for review and comment will be provided. When consensus has been achieved, application will be made to the National Education Goals Panel for certification of the environmental education standards as national standards.

The standards will be widely distributed through education associations to education officials, curriculum writers, and teachers. NAAEE emphasizes that its intention is not to duplicate work done by other groups, but rather to draw together existing standards and supplement them where necessary to present a coherent picture of the content of environmental education.

Education for Development

photo courtesy of Bill Stapp

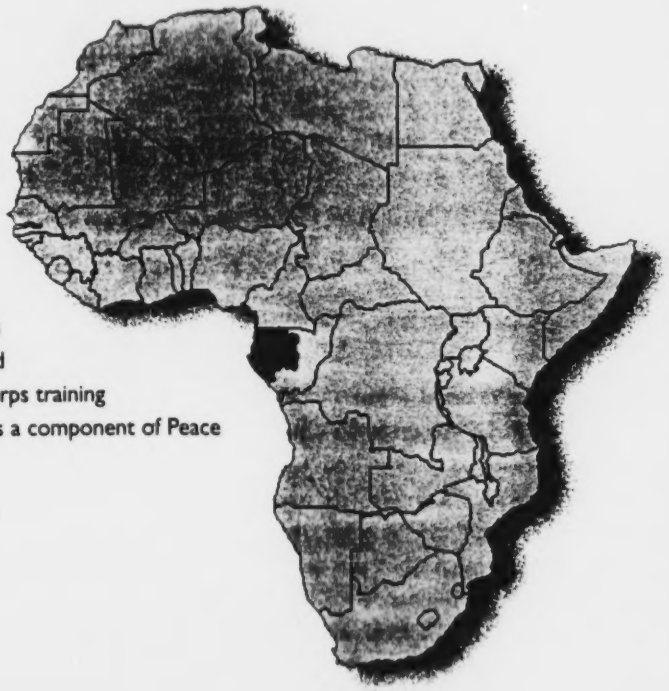
"During the environmental education conference, we learned about environmental issues in Gabon. But we also learned about how to incorporate environmental themes into the everyday curriculum. Environmental education offered a way to introduce new teaching methodology into the classroom and to make the lessons more relevant to students' lives."

Peace Corps Volunteer
Gabon

Teachers worldwide are completing professional training delivered by Peace Corps volunteers and local colleagues from the countries where the volunteers serve. The goal is to enhance mainstream education as a tool for community development. The strategy for implementing this "Education for Development" philosophy is simple: Infuse environment themes into traditional subjects such as mathematics, science, and English.

Gabonese educators, for example, are learning to use environmental and natural resources themes as part of exercises for developing English-language skills. Teachers of math, physics, and chemistry use specific examples from the environment to teach basic concepts.

One objective is to solidify a connection between schools and communities. Raising students' awareness of local environmental issues encourages community service, involves parents, and provides a real-life context for students to use their knowledge. In Gabon, many of the lesson plans and activities developed by educators as a result of the Peace Corps training are being adopted nationwide. This type of teacher training is a component of Peace Corps education projects throughout the world.



INITIATIVE 3.2

Create a focus group which is representative of formal and nonformal educators, including those who teach adults as well as youth, to develop and continually evaluate indicators of essential learnings for sustainability.

Sustainable living is a current topic of discussion in many classroom and nonformal educational programs across the nation. A process for review, compilation, and assessment of these ongoing programs will serve as a reality check for education for sustainability. Assessment is an essential step for receiving input from professionals on the development of essential learnings for sustainable living.

The purpose of this focus group will be to articulate and refine a workable definition of sustainability, capture the essence of key concepts, and clarify the critical components necessary to convey the cognitive and affective aspects of sustainable lifestyles. Where appropriate, the group may then recommend changes in national environmental education standards..

Conclusion

Education is often identified as the key to a desirable future. Within the education arena, groups are committed to global education, economic education, cultural diversity, and environmental protection and improvement. The key is linking the expertise and activities of these groups and articulating a shared vision that encourages a new comprehensive approach to education for sustainability.

As society enters the era of transition to sustainability, educational systems also are undergoing a transformation. Educational institutions face the responsibility of preparing students for challenges and opportunities that will require the ability to do complex reasoning focusing on global issues. The actions proposed in this chapter are needed to help pave the way for professionals in the field to "lead the conversation."

The Fetzer Vineyard Story

"The Fetzer Children's Program continues to be used as an example of what is possible when a business believes in the value of children's education and the environment."

Paul Dolan
CEO Fetzer Vineyard

The Fetzer Vineyard, which is located in Hopland, California, initiated the Fetzer Children's Garden & Culinary Arts Program in 1994 at the firm's organic garden and food education center. The Fetzer Children's Garden & Culinary Arts Program allowed children from the local community to use the Fetzer garden as a classroom setting. The children learned about how food is grown, how to make healthy choices in meal preparation, and how to see the interdependence between insects and the organic garden environment. Although the program was discontinued in 1996, Fetzer demonstrated that a business can create and fund a unique educational program for young children, teen leaders, and families. When preparation for the program began, the Fetzer staff, school district administrators, a teacher advisory board, the University of California at Davis Cooperative Extension personnel, 4-H Clubs, garden and culinary experts, environmental biologists, artists and poets, cultural docents, and teen leaders formed a partnership to design on-site and community experiences that demonstrate the connections from earth to the table and a healthy body.

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CHAPTER 2
Examples of Opportunities for Partnerships

National Wildlife Federation
Ecodemia
1400 16th Street, N.W.
Washington, D.C. 20036
To order call: 1-800-432-6564, ($14.95)

"*Ecodemia* is the story of how America's colleges and universities are changing their day-to-day operations in response to a growing environmental awareness."

The Fetzer Childrens Garden & Culinary Arts Program
1621 Cedar Street
Calistoga, CA 95415
Phone: 707-942-4011
Fax: 707-944-8606
E-mail: fetzer@fetzer.com
WWWeb: http://.fetzer.com

Model Links Program
P.O. Box 47200
Olympia, WA 98504-7200
Phone: 360-664-3684
Fax: 360-586-3894
E-mail: modellinks@igc.apc.org
WWWeb: http://cisl.ospi.wednet.edu

The Model Links Program is a project creating 10 prototype projects to demonstrate that environmental education is a powerful tool for helping implement essential learnings in reading, writing, communication, and mathematics. Participating elementary and middle schools will develop and implement a curriculum integration plan with environmental education as the focus of their restructuring efforts. In 1993, this project was initiated with a $250,000 grant from U.S. Environmental Protection Agency under the Environmental Educational Grants program.

National Education Goals Panel
1255 22nd Street, N.W., Suite 502
Washington, D.C. 20037
Contact: Ken Nelson,
Phone: 202-632-0952
Fax: 202-632-0957

The National Education Goals Panel is a bipartisan and intergovernmental body of federal and state officials created in July 1990 to assess state and national progress toward achieving the National Education Goals. President Clinton established the Goals Panel an independent federal agency in 1994 by signing the Goals 2000: Education America Act. The Goals 2000 Hotline is 1-800-USA-LEARN.

North American Association for Environmental Education (NAAEE)

1255 23rd Street., N.W., Suite 400
Washington, D.C. 20037
Contact: Ed McCrae
Phone: 202-884-8912
Fax: 202-884-8701

The North American Association for Environmental Education is a network of professionals and students working in the field of environmental education throughout North America and more than 25 countries around the world. The organization promotes and supports the work of environmental educators. NAAEE is also a major partner is the Environmental Education and Training Partnership (EETAP).

Peace Corps

1990 K Street, N.W.
Washington, DC 20526
Contact: Jamie Watts
Phone: 202-606-3100
Fax: 202-606-3024
E-mail: jwatts@peacecorps.gov
WWWeb: http://www.peacecorps.gov

The mission of the Peace Corps is to promote world peace and friendship by providing qualified volunteers to interested countries in need of trained manpower, by fostering a better understanding of Americans on the part of the people served, and by fostering a better understanding of other people on the part of Americans.

World Resources Institute (WRI)

1709 New York Avenue, N.W.
Washington, D.C. 20006
Contact: Mary Paden
Phone: 202-662-2573
Fax: 202-638-0036
E-mail: mary@wri.org
WWWeb: http://www.wri.org/wri/enved

The World Resources Institute, a policy research and capacity building institute that works internationally on environment and development issues, maintains an environmental education project that produces secondary school and university level educational materials on issues such as sustainable development, water pollution, deforestation, urban development, poverty, population growth, and resources consumption. WRI's Environmental Education Project works with other organizations to promote quality environmental education in the United States and worldwide.

CHAPTER THREE

NON FORMAL *education*

CITIZENS OF THIS COUNTRY HAVE MORE OPPORTUNITIES FOR educational experiences in their daily lives than ever before. Formal learning is only the beginning. Today, we can gain information and knowledge through the media, our workplaces, and community activities. Nonformal education offers hands-on experiences as well as more traditional modes of learning. As indicated by the Commission on Global Governance, the need for these nonformal educational experiences is urgent:

"The collective power of people to shape the future is greater now than ever before, and the need to exercise it is more compelling. Mobilizing that power to make life in the twenty-first century more democratic, more secure, and more sustainable is the foremost challenge of this generation."[18]

Systematic approaches are needed to help educational consumers sort through and tie together the information resulting from everyday experiences. *An Agenda for Action* attempts to articulate opportunities to craft nonformal educational experiences that enhance the ability of citizens to be better consumers, producers, policymakers, and stewards of the environment for their communities.

POLICY RECOMMENDATION 2

Nonformal Education

Expand public access to opportunities to learn about sustainability issues as they relate to the private, work, and community lives of individuals.

Action 4: Public Awareness

Support a campaign to raise public awareness of sustainability, convey information on indicators of sustainable development, and encourage individuals to adopt sustainable practices in their daily lives.

Finding

In today's world, information about the global environment, and sustainable development is increasingly available through television, print media, telecommunications networks, and commercial software products. Using this information, American citizens make decisions about day-to-day actions on what to buy and what to do about issues that affect their communities. Although the public has a heightened awareness of sustainability issues and is responding by making wise decisions regarding those issues, the process of sifting through information is not as easy or helpful as many would like. Unclear messages increase the difficulty of encouraging an individual (or targeted audience) to engage in action or make informed choices.

Federal agencies such as the U.S. Environmental Protection Agency and the U. S. Department of Commerce, Bureau of Economic Analysis and groups such as the President's Council on Sustainable Development are creating sustainable development indicators so that the American public can track and monitor progress in specific areas. Yardsticks for measuring our nation's progress toward sustainability and staying in touch with the impacts of day-to-day actions on natural and built environments, economic growth and social systems are vital. Such efforts can benefit from media attention and support from groups working cooperatively to raise the collective awareness and knowledge base of the American public. Only then can the public's understanding of the meaning and importance of sustainability be enhanced.

School systems in the United States are struggling to develop and implement the requisite curricula to teach youngsters about the importance of sustainability and its relationship to quality of life. Businesses, community groups, and professional organizations have engaged in this dialogue and have been quick to realize that more information is needed.

INITIATIVE 4.1

Foster increased public awareness of sustainability through a public awareness program.

A concerted public awareness effort will assist the American public in gaining a firm grasp of the concept of sustainability and the practices that promote it. The program should employ specific examples of everyday actions that are sustainable, descriptive, potential cumulative benefits associated with sustainable behavior, and the positive impacts of changed U.S. policies and practices on the world as a whole.

If these efforts are successful, individuals will understand that these changes are worthwhile and have the potential to raise the quality of their lives. Easily understood information should be shared on a regular basis. This information should include relevant measures to gauge societal progress towards sustainability.

INITIATIVE 4.2

Support a system of regularly updated, comprehensible national benchmarks of progress toward the goals of sustainability.

Throughout the United States, decisions are made that affect the long-term health and viability of communities. These decisions are responses to growth and development issues and the use and protection of natural resources. Individual citizens often sense a gap between their own day-to-day choices and the impact on events at the broader community, national, or global scales.

With help from the media, a focused partnership aimed at informing the public about indicators of sustainability can help bridge this gap. The indicators can provide citizens with information that demonstrates individual contributions to the overall picture. Such efforts are under discussion, but no one best formula has been found to date. With further discussion, however, a system of benchmarks will emerge that can play a significant role in informing individuals.

INITIATIVE 4.3

Entertainment media may consider designing a coordinated media campaign to raise youngsters' awareness of sustainability.

The popularity of the Mighty Morphin Power Rangers, a television program that is seen in 80 countries by 300 million children a day, suggests that entertainment media can play a role in raising the awareness of young children about a concept like sustainability.[19] Such an effort must engage a wide range of stakeholders and yield benefits for all—most importantly, children.

Rescue Mission: Planet Earth

Sustainable Development Indicators

Young people around the world are playing a role in monitoring progress toward sustainable development through the Sustainability Indicators Project, which is sponsored by the United Nations. Under this project, youth help measure progress toward building and maintaining healthy communities. The Sustainability Indicators Project is spearheaded by Rescue Mission: Planet Earth, an organization with affiliates throughout the world.

School groups, individuals, community groups, and families are invited to participate in the project. The kinds of questions the program is trying to address include: "What is happening in your community?" "Are people becoming more prosperous while at the same time healing and conserving the environment?"

Rescue Mission was begun in 1992 by Peace Child International. The initial project, a book titled *Rescue Mission: Planet Earth*, is a children's edition of *Agenda 21*. The book, which is filled with case studies, pictures, poems, and photos, was written and illustrated by thousands of young people around the world.

After publication of the book, *Rescue Mission: Planet Earth* became an independent organization. The United Nations asked Rescue Mission to create a project that will give young people a role in identifying sustainability indicators and monitoring the progress achieved since the 1992 Earth Summit in Rio.

illustration: Rescue Mission Planet Earth

What is an "INDICATOR"?

Sustainable Development Indicators are based on the broad issues discussed in *Agenda 21* and involve looking at specific environmental or social issues, pinpointing trends through analysis. For example, if youth in Seattle, Washington, monitor the number of days each year they can see the peak of Mount Rainier, then this can be a simple indicator of air quality in that region. Similarly, youth can determine the number of new jobs created in a community in a given year, or analyze population growth over time. For further information on the "Rescue Mission Indicators Packet," contact Rescue Mission or The Foundation for the Future of Youth.

34

INITIATIVE 4.4

Support the continued outreach to American journalists on issues related to sustainability.

Efforts have been launched to inform the journalism community in a systematic way about issues of global environmental concern. Examples include *The Reporter's Environmental Handbook*, published by the New Jersey Institute of Technology and *Reporting Climate Change*, published by the National Safety Council. Such efforts have been limited, however, and require additional resources and a broader base of information on current, accurate findings.

INITIATIVE 4.5

Establish incentive programs, such as national awards, to recognize successful partnerships within the business community that support educational efforts on sustainability.

The private sector, especially the business community, has been responsible for some of the most innovative programs in the environmental and sustainable development arena. Nevertheless, school personnel struggle to establish successful partnerships to tap the expertise of the business and industry community. At the same time, businesses are searching to identify the best educational approaches.

Incentives are needed to encourage and sustain partnerships and successes that are working. Recognition for those who are investing resources and creative energy in the formation and implementation of educational programs can encourage others if they believe that their work will be publicly acknowledged.

Action 5: Sustainable Development Extension Network

Establish an extension network to enhance the capacity of individuals, workforces, and communities to live sustainably.

Finding

If the public is to become more involved in local sustainability issues, support mechanisms are needed to translate research information, transfer new technologies, introduce educational strategies, develop public policy, and organize at the community level to chart sustainable courses of action. A successful extension network would empower individuals in communities to shape their own futures through an appropriate mix of education, technical assistance, and fiscal support. Extension networks give individuals the tools to control their own futures, while providing data and information, educational expertise, and needed financial assistance.

In addition to the Cooperative Extension System (USDA) based on the Smith-Lever Act,[20] other federal agencies have developed extension services, such as Sea Grant (NOAA), Space Grant (NASA), and the Manufacturing Extension Service (Commerce). These extension units need a mechanism whereby they can continue to use their own networks, invest their own funds, partner with other agencies, and make contributions to communities around a common set of goals.

INITIATIVE 5.1

Establish a national Sustainable Development Extension Network (SUDENET) to foster access to information, technical expertise, and collaborative strategies that result in action taken by local communities.

A new mechanism is needed that includes but is not exclusively controlled by any one existing extension entity. A redefined Sustainable Development Extension Network could employ services offered by diverse educational units such as community colleges, public schools, and private sector educational entities, as well as nongovernmental organizations focusing on similar issues and priorities. At the same time, the new network can build upon the

current infrastructure that exists in every county in the United States through the Cooperative Extension System, Sea Grant, and Space Grant programs.

The existing extension system could contribute to the new Sustainable Development Extension Network by providing technical assistance that brings together researchers who are developing new technologies and those who adopt those new technologies; promoting sustainable development practices by providing information on sustainable alternatives and benefits; facilitating community visioning and planning processes; and providing access to current data and information available through electronic gateways.

A national Sustainable Development Extension Network could help provide bridges among areas of expertise in government agencies, universities, and colleges. To address the concerns of consumers, producers, communities, and individuals, a new collaborative strategy could be deployed among organizations that would provide assistance. A Sustainable Development Extension Network also would help ensure that local needs drive national policy; national policy and programs are coordinated; and research, education, and extension roles for government and private sector agencies are clarified. Success ultimately will be assessed by the actions taken by local communities.

A Sustainable Development Extension Network should be coordinated with other initiatives described in *An Agenda for Action*.

More specifically, the network could:

1. Assist in the implementation of a national effort to increase awareness of sustainability at the state and community levels.
2. Identify, document, and electronically link community civic groups, schools, businesses, and other entities interested in sustainable development.
3. Provide for local and state participation in the development of essential learnings in sustainability, design of community visioning and assessment processes, student performance outcomes, criteria for curriculum development, and other standards.
4. Coordinate the efforts of major groups that design community visioning and assessment processes by documenting strategies and compiling results of such efforts.
5. Identify model programs that satisfy agreed-upon standards of sustainable development.
6. Design and deliver training to organizations and individuals interested in applying principles of sustainability to their businesses, governments, projects, families, or schools.
7. Develop a five-year plan of action that targets specific geographic areas through a priority-setting process, and recommend public policy that enables the actions.
8. Develop a multidimensional matrix that includes environmental, economic, and social components so each agency role will be maximized in terms of education, technical support, and financial assistance to specific geographic areas.
9. Coordinate the above functions with new and existing clearinghouses related to education for sustainability across the country.

The proposed action plans, management structure, funding mechanism, and evaluation indicators for the Sustainable Development Extension Network are based on shared decision-making and leadership, coordinated actions, individual and collective organizational accountability for funds and program outcomes, and management for results. Although the goal might be reached more quickly through unilateral investment in a single organizational entity, the national goal of sustainable development requires a more comprehensive strategy.

Representatives from the participating agencies as well as state consortia should direct a process to determine how a Sustainable Development Extension Network can best be managed, staffed, and financed. The process should be coordinated with the national policy recommendations from the President's Council on Sustainable Development and the Sustainable Communities Implementation Team of the National Environmental Technology Strategy. This process should result in the development of accountability indicators, collection of data, analysis of results, and formulation of recommendations and conclusions concerning a Sustainable Development Extension Network.

The formation, structure, management, leadership, and implementation of a Sustainable Development Extension Network could be based on the following principles:

- Research-based technology is generated and applied as determined by community needs.
- Transfer of technology to communities and individuals is based on an appropriate combination of education plus technical and financial support aimed at user adoption.
- Management processes for identifying needs, setting priorities, and building coalitions and partnerships are inclusionary.
- Targeted and focused assistance responds directly to local communities and needs.
- Existing research, education, and extension management and delivery systems are utilized, redefined, and expanded.
- Alternative implementation strategies and organizational participation models are provided.
- Consistency in substance among programs and the results from programs are based on a verified set of principles and outcomes.
- Management and design of the structure and process are not dominated by any one entity, but developed through a collaborative process of defining common goals and unique organizational roles.

Action 6: Community Visioning and Assessment

Encourage partnerships and activities that support community visioning and assessment activities.

Finding

Visioning processes enable communities to plan for the long-term health of their communities and make decisions that will determine the economic viability of their communities. Many communities across the nation have taken this challenge seriously and are engaged in a process of visioning and assessment leading to strategic planning. Local decision-making can be enhanced with information and technical assistance from state and federal governments.

At the international level, Chapter 28 of *Agenda* 21 of the 1992 United Nations Conference on Environment and Development (UNCED) charged communities with formulating action plans to move toward a sustainable future.[21] This process calls for the broadest possible public participation, with representatives from diverse areas coming together to define sustainability on the local level and support plans and projects that will implement their communities' visions.

Farmers and Rural Landowners Take Positive Steps

In 1991, a group of federal agencies initiated a unique voluntary approach to pollution prevention in rural areas. The Farm Assessment System and Home Assessment System (Farm*A*Syst/Home*A*Syst) has a simple goal: with technical assistance from the agencies, landowners increase their knowledge of health- and non-health-related risks from pollution, look critically at their property, and then take voluntary actions to reduce the risks.

To date, more than 22,000 individual assessments have been conducted by farmers, rural homeowners, and ranchers. Actions they have taken to reduce risks on their property range from improving indoor air quality to reducing lead levels in drinking water and improving petroleum storage and pesticides handling.

Participants have invested more than $15 million to reduce environmental risks. The success of the program lies in its flexible framework and the local support it generates.

Farm*A*Syst/Home*A*Syst program materials have been adapted for multicultural use and integration into school curricula. The program is a cooperative effort initiated by the U.S. Department of Agriculture's Cooperative State Research, Education, and Extension Service, USDA's Natural Resources Conservation Service, and the U.S. Environmental Protection Agency. A number of interagency and private sector partnerships are supporting the programs throughout the United States and Canada.

As a follow-up to *Agenda 21* in the United States, the President's Council on Sustainable Development (PCSD) was organized to recommend an action strategy to move the nation toward a sustainable future. One of the Council's eight task forces was the Sustainable Communities Task Force. Likewise, a Sustainable Communities Implementation Team emerged from the *National Environmental Technology Strategy* developed by the National Science and Technology Council. These community visioning and assessment efforts at the national level have helped to reinforce the numerous community groups throughout the country that are achieving local successes by taking new directions and action at the local level.

Support for community visioning and assessment can be coordinated with other initiatives proposed in *An Agenda for Action*. Interactions with the proposed Sustainable Development Extension Network, essential learnings efforts in formal education, lifelong learning programs, and the national information clearinghouse should be fostered. Just as Goals 2000 relies extensively on community support for educational excellence, community-based educational institutions play a central role in shaping the future of communities. Recognition of the importance of education in the overall design and implementation of a community vision is a key element of this initiative.

INITIATIVE 6.1

Create a national program in partnership with organizations that may include the National Council of Mayors, the National Governors' Association, and the National Association of Counties, that will provide educational resources and leadership training in support of community visioning and assessment.

National support of visioning processes can include facilitating the exchange of ideas by providing appropriate and timely information about successful models for replication; training of leaders for visioning processes; expansion of local, regional, national, and international visioning networks; and engagement of communities across the nation in integrated, holistic approaches to long-term planning for sustainable communities.

A national program such as this could include the following four components: (1) Identifying and compiling examples of visioning processes that have been successful in communities in the United States and other nations; (2) Designing and developing a workbook and other resource materials for dissemination to interested communities to serve as a guidebook for action and planning at the community level; (3) Establishing a Leadership Institute for Sustainable Communities to train leaders in facilitating cooperative planning by diverse stakeholders; and (4) Establishing a council

through the proposed Sustainable Development Extension Network to coordinate efforts at the state and federal levels in support of community visioning activities.

A number of communities are in various stages of defining their future and are employing a variety of visioning approaches. A national clearinghouse could facilitate the sharing of successful strategies from communities of various sizes that are wrestling with challenges in diverse environmental and economic contexts. These successes can serve as models for communities with similar characteristics. The tasks to accomplish this include:

Identifying and compiling examples of visioning processes that have been successful in communities in the United States and other nations.

- Identifying successful practices, analyzing the processes used, and distilling commonalities into transferable models.
- Developing print and media materials that illustrate these models and describe methods for replicating visioning and long-term planning processes.

Designing and developing a workbook and other resource materials for dissemination to interested communities to serve as a guidebook for action and planning at the community level.

A structured workbook and other information can aid stakeholders in planning, dialogue, and information gathering at the local level. Indicators of progress or benchmarks described in the workbook could include:

- Demonstration of investment by partners representing diverse constituencies;
- Ongoing engagement in a community visioning process or commitment to begin such a process;
- Definition of the "community," i.e., population center, a coalition of communities in a region, watershed, or ecoregion;
- Identification of currently existing resources, i.e., constituencies, community resources, and natural resources;
- Design of a mechanism for continuously redefining, reinvesting, and reinventing the community as a self-sustaining entity; and
- Emphasis on continuing education, training, and retooling designed to generate a workforce that is appropriately prepared for new technologies and job opportunities.

Establishing a Leadership Institute for Sustainable Communities to train leaders in facilitating cooperative planning by diverse stakeholders.

Key to the success of community visioning and planning are skillful leadership and advocacy by a few central figures.

- A "trainer of leaders model" could be developed and implemented as part of the initial phase of encouraging communities to participate in a visioning process with long-term planning toward a sustainable future.
- The model could emphasize teamwork building, processes for inclusion of all constituencies, group facilitation skills, networking, and volunteerism.
- Leaders and communities with successful experiences could serve as a cadre of mentors and development teams to transfer knowledge and skills to other leaders in communities with similar needs and characteristics (e.g., sister cities).

Establishing a council through the Sustainable Development Extension Network to coordinate efforts at the state and federal levels in support of community visioning activities.

- The proposed Sustainable Development Extension Network should form a coordinating council with representatives from federal agencies, local and state governments, business and industry, nongovernmental organizations, and professional associations.
- The council should provide a management function at the national level and encourage a coordination function at the state level.
- A streamlined, accessible, and efficient system for enabling communities to request assistance for planning grants, consulting services, community assessments, and educational support should be implemented.

Action 7: Workforce Development

Infuse sustainability concepts and practices into development of the U.S. workforce.

Finding

The current workforce must have the opportunity to develop the skills needed to work sustainably, and future workers need to be adequately prepared in this area prior to entering the workforce. Training for sustainability will require initiatives at the state and community levels. Workforce development is also an important concern for federal policymaking since fewer than 25 percent of our nation's population obtains a four-year university degree.[22] Solutions will require new federal policies similar to those of the School-to-Work Opportunities Act.[23] Work-based learning, coupled with related academic training, can provide America's young people with the knowledge and skills they need to make an effective transition from school to a first job in a high-skill, high-wage career track.

Partnership Prepares Youth for Tomorrow's World

photo courtesy of the U.S. Department of Education

High school juniors and seniors in New York state's southern area are completing apprenticeships in the printing industry, thanks to a partnership spearheaded by the Cornell Cooperative Extension in Broome County. Students learn about environmental regulations that insure high standards during product design and manufacture. They also acquire the technical and social skills necessary to enter a high-performance workplace.

Partners include a number of area high schools, the Cornell Youth and Work Program at Cornell University, and the Anitec Image Corporation, a division of International Paper. By working together, the partners in this model apprenticeship program are involving young people in an industry's manufacturing, research, and development processes. Cornell Cooperative Extension and the Business Alliance in Broome County administer the program.

"In the new global economy, the only resource that is really rooted in a nation—the ultimate source of all its wealth—is its people. To compete and win, our workforce must be well educated, well trained, and highly skilled."

Robert B. Reich
Secretary
U.S. Department of Labor

The transition from an agricultural to an industrial society and, more recently, to an information society have prompted changes in employment that have not been sufficiently reflected in workforce development programs. Occupations that once offered solid careers are in decline; therefore people who are planning their careers need to assess what skills will be in demand. Employment is expected to reach 147.5 million by 2005, a 12 percent rate of increase[24] over the coming decade. Since job projections are clouded by uncertainties caused by unforeseen changes in technology or the balance of trade, a workforce must be developed that is readily adaptable to change.

This need for flexibility and a highly skilled workforce presents a genuine opportunity for educators. If employers are willing to pay more for highly skilled workers, then the quality of education and training should be raised. If linked effectively to careers, the proportion of good jobs can be increased. The challenge is to sustain economic vitality and the quality of life that is sometimes taken for granted.

INITIATIVE 7.1

Disseminate effective school-to-work models that emphasize issues of sustainability while encouraging dialogue with the business sector to address sustainability through hiring and recruitment practices.

Because the national school-to-work initiative is built upon business partnerships, it is important for these programs to integrate components of industry-based skill standards. In addition, although many programs are in operation, those that promote sustainability have not been identified.

As efforts like these are launched, the business community could provide job opportunities and internships for students who are studying the principles of sustainable development. Attention given to hiring and recruitment practices would help complete the cycle and secure an appropriately trained workforce.

INITIATIVE 7.2

Strengthen the partnership between the U.S. Department of Labor and the American Association of Community Colleges to support education for sustainability.

42

The development of partnerships with institutions of higher education that have the capacity to deliver training to large numbers of workers is of paramount importance. A partnership funded by the U.S. Department of Labor is attempting to implement a comprehensive workforce training initiative that is based in community colleges. The partnership is designed to enhance the effectiveness of the community college system in responding to the retraining needs of dislocated workers as well as incumbent workers seeking to upgrade their skills or obtain skills certification. The information resulting from this project is disseminated via the Training Technology Resource Center, operated by the U.S. Department of Labor.

INITIATIVE 7.3

Use the U.S. Department of Labor's Training Technology Resource Center as the dissemination vehicle for workforce development information on programs, research, and organizations in the area of education for sustainability.

The center is an on-line information resource created by the U.S. Department of Labor's Employment and Training Administration to gather and disseminate information related to current workforce development programs and practices. This initiative would engage the department's regional offices in the identification and collection of programs, practices, and policies at the local level. Involvement of the regional offices is an important component of the Center's reinvention activities.

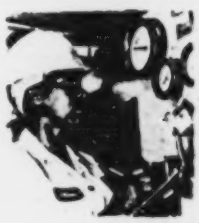
INITIATIVE 7.4

Examine the feasibility within the Department of Labor's Occupational Information Network (O*NET) of collecting and disseminating information on emerging occupations in energy efficiency and waste reduction.

The Department of Labor's Occupational Information Network is an automated replacement for the department's print-based "Dictionary of Occupational Titles." O*NET provides a

Training and Employment for Disadvantaged Youth in Maine

The Penobscot Job Corps Center, located in Bangor, Maine, is the first center in the country to offer a program in Waste Water Treatment. Students enter an actual "shop" environment that includes a sludge pilot plant, laboratory and maintenance shop. They are assigned a peer mentor for the first month, and they receive an array of classroom-type teaching aids. Participants study water quality and environmental issues. They learn how to determine load requirements by interpreting meter and gauge readings, how to regulate the flow of sewage by monitoring control panels and adjusting valves and gates, and how to conduct the tests required at waste water plants. A variety of completion levels are offered, along with opportunities for off-center training at three of Maine's waste water treatment plants. Students who successfully complete the training can expect a competitive salary.



About Job Corps

Job Corps is a national training and employment program administered by the Department of Labor, which serves economically disadvantaged young people between the ages of 16 and 24, primarily high school dropouts. Unique to Job Corps and key to its success is its residential program, offering students comprehensive services 24 hours a day. Job Corps operates through a partnership among government, labor, and the private sector.

43

photo courtesy of the U.S. Department of Education

timely, easy-to-use computer database that supports national efforts to revitalize the American workforce. The database is an operational prototype for collecting, analyzing, organizing, publishing, and disseminating scientifically verified information on worker skills and job requirements. O*NET will help millions of employers, workers, educators, and students make informed decisions about education, training, and careers. It also could foster sustainability by highlighting occupations related to energy efficiency and waste reduction.

Action 8: Lifelong Learning

Encourage lifelong learning about sustainability at the individual, household, and community levels.

Finding

As commonly defined, lifelong learning is "adult education for individuals who no longer attend school on a regular, full-time basis." The term *lifelong learning* encompasses adult education for vocational and professional advancement, enjoyment and leisure, and remediation for improving basic skills and knowledge needed to function as a member of a family or community. Although the concept initially focused on community colleges, the idea is spreading to public schools, institutions of higher education, community agencies, proprietary schools, and computer software developers.

The continually changing world in which we live requires that learners of all ages educate themselves throughout their lives. This need is compounded by the fact that fewer than 25 percent of the U.S. population obtains a four-year college degree. Among two-year college students enrolled as students in October 1990, 77 percent were not enrolled a year later.[25] Given these statistics, many individuals must obtain skills outside the classroom.

More people than ever before are looking to various forms of lifelong learning opportunities to upgrade their skills and increase their job stability. In the 1970s, more than 80 percent of all adults were involved in self-directed learning each year, and the average adult spent 500 hours a year in either formal or nonformal learning programs.[26] More than 60 million adults participated in some form of lifelong learning activities in the 1980s.[27] Figures released by the College Board in 1993 demonstrate that the proportion of adult students in college enrollments has been increasing steadily over the past two decades: from about 30 percent in 1970 to 40 percent in 1980 to close to 45 percent in 1990.[28]

The U.S. Department of Commerce has found that in most regions of the world, the population aged 15 to 64 is expected to grow faster than the school-age population.[29] In addition, by the year 2020 people who are 60-plus in North America, Europe, and the former Soviet Union will constitute 24 percent of the population of those regions as compared with individuals from birth to 4, who will comprise 6 percent.[30] These demographic changes suggest that opportunities for lifelong learning will become increasingly important.

Americans need to remain competitive in the workplace, both domestically and internationally. Continuous learning helps bolster public awareness of the changing global marketplace while encouraging individuals to be more productive and successful citizens. Technology helps adult learners gain greater control over when, where, and how they obtain new skills and knowledge. Computers and telecommunication devices provide new access to learning for remote populations, special populations such as the disabled, and workers on-site and at home.

Learning about the concept of sustainability is an ongoing process. Learning opportunities should include the essential learnings of sustainable development and the practical approaches that contribute to sustainable living.

Lifelong learning at the individual level is critical to reaching the National Education Goal's fifth objective, which states that every adult American will be literate by year 2000 and will possess the knowledge and skills necessary to compete in a global economy.[31] To keep abreast of changes in their fields and advances in technology, an increasing number of adults are taking courses to advance their careers, upgrade their skills, and enrich their lives. As a result, the Bureau of Labor Statistics has reported that employment of adult educators is expected to grow faster than the average for other occupations as the demand for adult education programs continues to rise.[32]

Many members of our nation's adult population lack the literacy and mathematical skills needed for success in modern society. Basic education for adults is an increasing concern because of low literacy levels among the adult population. In 1990, nearly one billion adults worldwide aged 15 and over were illiterate.[33] The National Adult Literacy Survey of 1992 revealed that approximately 48 percent of the adults in the United States score

Physicians for the Environment

Educating Doctors and the Public

The health care industry is educating its workforce about the environment through activities of the National Association of Physicians for the Environment (NAPE). Founded in 1992, NAPE encourages physicians, nurses, pharmacists, and veterinarians to inform patients and animal owners about the impacts of environmental pollutants on health so they understand that pollution prevention is disease prevention. Members include the American Medical Association and thirty other medical societies.

The organization has instituted a nationwide program to "green" more than 388,500 medical facilities: offices of physicians, dentists, and veterinarians; medical clinics; long-term health care facilities; laboratories; blood banks; medical schools; pharmacies; and the offices of health organizations such as the American Cancer Society and American Lung Association.

Other activities include establishing environmental audits in hospitals, medical schools, and pharmaceutical companies to reduce energy consumption and medical wastes; convening conferences on environmental health issues, such as air and water pollution; emerging infectious diseases; establishing a clearinghouse and Internet home page for health information related to environmental issues; encouraging physicians to take a leadership role in their communities to educate the public about health-related environmental issues; helping the U.S. Environmental Protection Agency educate physicians and the public about the UV Index developed by the National Weather Service; and involving physicians in global environmental issues such as biodiversity, e.g., by surveying the 150 most widely prescribed drugs to determine their derivation from the natural world.

NAPE could be a model for a national coalition of health professionals for the environment. Members could include organizations for nurses and health-related professionals such as epidemiologists and toxicologists; health and life insurance groups; hospitals; medical media; pharmaceutical organizations; biotechnology associations; and voluntary health organizations. Medical schools have already formed the Consortium for Environmental Education in Medicine, whose membership includes faculty members from Boston University, Brown, Harvard, Massachusetts, Tufts and Rhode Island medical schools.

at the two lowest levels of literacy proficiency, i.e., indicating that they are almost illiterate.[14] Comprehensive adult literacy programs that teach out-of-school adults basic literacy and occupational skills are the most beneficial programs because they allow individuals to obtain jobs and lead more successful and satisfying lives.

Encouraging lifelong learning about sustainability at the household level depends partly on the extent to which adults are aware and pass on that knowledge. If parents are lifelong learners, children also are likely to become lifelong learners. When adults take full advantage of the many resources available in their community, they will strengthen the relationship between home and school while enhancing their own work and personal lives.

At the community level, libraries are an important force in fostering literacy skills and providing adult part-time education. Community colleges offer a valuable resource as well. Community college programs that serve the needs of the community and strengthen the education of local citizens should be identified and promoted.

INITIATIVE 8.1

Develop community college courses and programs aimed at producing the skills and information needed for contributing to sustainable activities at work and during leisure activities.

Courses should highlight retraining on practical skills and the changing role of technology. Continued efforts by nonprofit groups, civic organizations, and the business community are needed to ensure that needs responding to a vision of healthy, prosperous neighborhoods and communities are being identified and met.

Vision into Action

Software for Understanding Sustainability

A promising computer software program for lifelong learning about sustainability is currently under development. "Vision into Action," is aimed at helping individuals and families move from a broad-brush understanding of global sustainability to a comprehension of its meaning in their own lives and communities.

Users work through a personal, family, and community assessment and visioning process. A number of success stories and models of sustainability are documented that can be adapted by individuals for use in their own lives, businesses, and organizations. They also can enter data to track their own progress toward sustainability.

The developers welcome submission of examples from communities and families. Once development is completed, the "Vision into Action" program will be available from the Global Action and Information Network in Santa Cruz, California.

Reaching Out—Promoting Community Sustainability

The Center for Better Communities, headquartered in Honolulu, Hawaii, is a relatively new nonprofit organization comprised of planners, architects, and concerned citizens who strive to create better, and more livable communities. The Center functions as a resource for information on new visions for designing communities. Founders of the organization say that one of their key roles is initiating and facilitating discussion of fresh alternatives to existing development patterns in order to address issues of diversity, equity, and a healthy, prosperous future.

Workshops, conferences, training, and other services are used to raise awareness and inform the public, elected officials, educators, and other professionals. A seminar series entitled "Re-inventing the Environmental Agenda" serves as a community forum for discussing current environmental issues and highlights examples of how ordinary people, locally and globally, are taking the lead in achieving sustainability. The Center's over-riding goal is community capacity-building, i.e., nurturing the ability for people to problem solve responsibly as a community.

> *"I believe that sustainability is the organizing principle—both context and framework—for environmental literacy.... It merges education and application, so learning becomes a way of life for taking personal responsibility—together—for all decisions that affect the environment. The essential building blocks for sustainability are our daily lifestyle choices."*
>
> Ramona K. Mullahey
> *Center for Better Communities*

Conclusion

Conclusion

A range of educational opportunities and venues must be tapped as tools for raising public awareness and knowledge of sustainability. More attention must be directed to these tools—how they are developed and how they are used—by the business and nonprofit sectors as well as those whose primary mission is education. Current research reveals that Americans are increasingly concerned about the needs of future generations.[35] The challenge is to work to sustain quality of life and a healthy environment.

CHAPTER 3
Examples of Opportunities for Partnerships

The American Association of Community Colleges
One Dupont Circle, N.W. Suite 410
Washington, D.C. 20036
Contact: James McKenney
Phone: 202-728-0200

The American Association of Community Colleges serves the interests of the nation's two-year colleges; ensuring that the achievements, capacities, and interests of the colleges are recognized and understood among U.S. Congress, The White House, and federal agencies. It also collaborates with national higher education associations, trade associations, and other groups that represent the constituencies that are important to local colleges. The association's role encompasses advocacy, policy initiatives, research, educational services, and coordination.

Center for Better Communities
PO Box 1348
Honolulu, HI 96807
Contact: Ramona Mullahey or Alex Neuhold
Phone: 808-533-0777
Fax: 808-528-4217

The Center for Better Communities is a nonprofit, tax-exempt educational resource organization, founded in 1995, whose mission is to foster research, thought, and action in support of quality environments and more livable communities.

The Consortium for Environmental Education in Medicine (CEEM)
17 Monsignor O'Brien Highway
Cambridge, MA 02141
Contact: Madaleine R. Ochinang
Phone: 617-227-8901
Fax: 617-227-0104
E-mail: CEEM@2nature.org
WWWeb: http://www.2nature.org/CEEM/ceem.HTM

The Consortium for Environmental Education in Medicine is a nonprofit organization dedicated to advancing human health by understanding its relation to the environment. CEEM is working on a systematic effort to bring environment and health perspectives into medical education.

Cornell Cooperative Extension
358 Roberts Hall
Cornell University
Ithaca, NY 14853
Contact: Benjamin Wood
Phone: 607-255-2231
Fax: 607-255-0788
E-mail: benjamin_wood@cce.cornell.edu

The Cornell Cooperative Extension System links research, knowledge, and technology to the needs of individuals, families, businesses, and communities throughout New York State. The systems purpose is to provide economic, social, environmental, and agricultural education.

Farm*A*Syst/Home*A*Syst
Voluntary Pollution Prevention Programs

B142 Steenbock Library
Madison, WI 53706
Contact: Gary W. Jackson
Phone: 608-262-0024
Fax: 608-265-2775
E-mail: farmasyst@macc.wisc.edu
homeasyst@macc.wisc.edu
WWWeb: http://www.wisc.edu/farmasyst/

Farm*A*Syst/Home*A*Syst is a successful partnership between government and industry that meets the pollution challenges posed by farms and other rural resources. The program's formula of education, self-assessment, and action plans motivates rural landowners to voluntary action.

The Foundation for the Future of Youth

11426 Rockville Pike, Suite 100
Rockville, MD 20852
Contact: David Pines
Phone: 301-468-9431
Fax: 301-468-9612
E-mail: davidp@prevline.health.org
WWWeb: http://www.shs.net/rescue/found.htm

The Foundation for the Future of Youth is an idea-generating and problem-solving organization working with young people to develop a vision for their future and the mechanisms for realizing that vision. The foundation offers innovative thinking, strategic resources, and visionary leadership for building healthy environments. The foundation coordinates U.S. activities for the global action project spawned from Rescue Mission: Planet Earth, a young persons version of *Agenda 21*.

National Association of Physicians for the Environment (NAPE)

6410 Rockledge Drive, Suite 412
Bethesda, MD 20817
Contact : Betty Farley
Phone: 301-571-9791
Fax: 301-530-8910
E-mail: nape@ix.netcom.com
WWWeb: http://www.intr.net/napenet

NAPE, a nonprofit organization, works with the national medical specialties and subspecialties, with national, state, and local medical societies, and local medical societies, and with individual physicians to deal with the impacts of environmental pollutants on the organs, systems, or disease processes best known to them. NAPE also informs patients and the public about the impact of pollutants and the necessary health steps that should be taken to reduce or eliminate those pollutants.

O*NET: The Occupational Information Network

Office of Policy and Research
Employment and Training Administration, N5637
U.S. Department of Labor
Washington, D.C. 20210
Phone: 202-219-7161 x130

O*NET is the automated replacement for the print-based *Dictionary of Occupational Titles*. It provides a timely, easy-to-use computer database that supports national efforts to revitalize the American workforce. O*NET is an operational prototype for collecting, analyzing, organizing, publishing, and disseminating scientifically verified, worker skill and job requirement information.

Penobscot Job Corps Center
1375 Union Street
Bangor, ME 04401
Contact: Greg Dumonthier
Phone: 207-990-3000 x168
Fax: 207-942-9829

Job Corps is the nations largest residential education and training program for disadvantaged youth. The program provides occupational exploration, world of work and social skills training, and competency-based vocational and basic education. Participants in Penobscot Job Corps Center's Waste Water Treatment program study water quality and environmental issues from the perspective of waste water treatment.

President's Council on Sustainable Development
730 Jackson Place, N.W.
Washington, D.C. 20503
Contact: Angela Park
Phone: 202-408-5296
Fax: 202-408-6839
E-mail: pcsd@igc.apc.org
WWWeb: http://www.whitehouse.gov/PCSD

The PCSD was established by President Clinton in 1993—a unique mix of 25 individuals representing business, labor, environmental, civil rights, tribal, and local leaders along with members of the President's Cabinet. The PCSD's mission is to develop a "national sustainable development action strategy that will foster economic vitality while protecting our natural and cultural resources." The PCSD produced a report that outlines the first steps the nation needs to take in order to move toward a more sustainable future.

Rescue Mission
The White House
Buntingford, Herts SG9 9AH
United Kingdom
Phone: (+44) 176-327-4459
Fax : (+44) 176-327-4460
E-mail: 100640.3551@compuserve.com

Rescue Mission works throughout the world bringing innovative thinking, strategic resources, and leadership to our young people and youth workers to develop and realize a vision for their future.

School-to-Work Opportunities Act
The National School to Work Office
400 Virginia Avenue, S.W., Suite 210
Washington, D.C. 20024
Contact: J.D. Hoye
Phone: 202-401-6222
Fax: 202-401-6211
E-mail: stw_lc@ed.gov
WWWeb: http://www.stw.ed.gov

The purpose of this Act is to establish a national framework within which all states can create statewide school-to-work opportunities systems that are a part of comprehensive education reform; are integrated with the systems developed under the Goals 2000: Educate America Act and the National Skill Standards Act of 1994; offer opportunities for all students to participate in a performance-based education and training program that will enable them to earn portable credentials: prepare the students for first jobs in high-skill, high-wage careers; and increase their opportunities for further education, including education in a four-year college or university.

Training Technology Resource Center
Room N6507
U.S. Department of Labor
Washington, D.C. 20210
Contact: Brian Shea
Phone: 1-800-488-0901
WWWeb: http://www.ttrc.doleta.gov

The Training Technology Resource Center was created by the U.S. Department of Labor's Employment and Training Administration to provide information on workforce development models, new initiatives, and emerging policies. Its mission is to serve as an electronic point of access to a wide range of workforce development information and to promote information sharing throughout the Employment and Training Community. The center accomplishes this by collecting and disseminating information on subjects like "one-stop career center systems," emerging training and learning technologies.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service (CSREES)
Aerospace Building, Room #329C
Ag Box 2210
Washington, D.C. 20250-2210
Contact: Greg Crosby, National Program Leader
Phone: 202-401-6050
Fax: 202-401-1706
WWWeb: http://www.reeusda.gov
E-mail: gcrosby@reeusda.gov

Vision Into Action Program
Global Action and Information Network
740 Front Street, Suite 355
Santa Cruz, CA 95060
Contact: Bill Leland
Phone: 408-457-0130
Fax: 408-457-0133
E-mail: info@gain.org
WWWeb: http://www.gain.org/gain/

The Vision Into Action Program is an interactive program to encourage individuals to act in their personal lives and communities for sustainability. The program guides people in setting goals, selecting appropriate actions, and monitoring progress toward sustainability.

CHAPTER FOUR

cross-cutting themes

MOVING FORWARD FROM THE STATUS QUO REQUIRES THE ARTICULATION of policies that can help establish an infrastructure for fostering education for sustainability. That journey can begin through the formulation of recommendations that are broad in scope, touch all learners, and can serve as catalysts for action. In this chapter, four cross-cutting actions are offered that lay the foundation for a solid infrastructure for education for sustainability.

These recommendations address goals both at the federal and state levels. They suggest taking advantage of communication and information technologies that access quantities of information never before possible in the classroom. They also take into account the planet's rich diversity of cultures and look beyond the United States to our nation's global partners. Together with their related actions, they are the building blocks for broadening education for sustainability.

POLICY RECOMMENDATION 3

Cross-Cutting Themes

Institute policy changes at the federal, state, and local levels to encourage education for sustainability; develop, use, and expand access to information technologies in all educational settings; and encourage understanding about how local issues fit into state, national, and international contexts.

Action 9: State and Federal Policy Changes

Initiate strategic state and federal policy changes, including establishing necessary partnerships, as the foundation for a coordinated strategy for education for sustainability.

Finding

At the state and federal levels, interest and investment in environmental education are long-standing. Historically, state and federal agencies have delivered a spectrum of programs and directed resources to advance environmental careers, as well as to protect and enhance human health and the environment. In addition, state and federal agencies have invested in promoting the increase in knowledge and skills needed for the public to make informed decisions about the use and conservation of natural resources. Encompassing the broader, overarching vision of sustainability will require partners in government to develop effective approaches to education and public understanding.

Limited resources hinder government efforts to support opportunities in the field of education for sustainability. Even when resources are available, there are no guarantees from year to year that the support will be reauthorized. Nor are available resources adequate to support agency missions and meet the public's need for education and training in this area.

A coordinated effort among federal agencies to foster collaboration, engage in long-term planning and sharing of resources should be pursued. One consequence of an uncoordinated single agency mission approach is duplication of efforts and overlap in programs. Enhancing cooperation and coordination will help in designing effective programs and materials that broadly reflect agency missions and respond to the public's needs.

Although exemplary collaborative projects at the state and federal levels are underway, the resources needed to sustain such efforts and maintain ongoing communication is a challenging undertaking. The result is a limited number of sustained quality programs and insufficient evaluation and promotion of the success of these programs.

Federal Activities

The Clinton Administration's priorities include the creation of jobs, educational reform, workforce training, economic competitiveness, and environmental protection. In short, the Administration has a strong commitment to sustainability. How can we meet the needs of today without compromising the ability of future generations to meet their own needs? One solution is education; another is technology.

The National Environmental Education Act of 1990 is designed to improve public understanding of the environment and to advance and develop environmental education and training. The Act directs the U.S. Environmental Protection Agency (EPA) to play a leadership role among federal agencies in implementing the new law and encourages partnerships among federal government agencies, local education institutions, state agencies, not-for-profit educational and environmental organizations, and the private sector. This role is assisted by the National Environmental Education and Training Foundation (NEETF). The Act has provided the EPA with the authority to administer national grants, teacher training, internship and youth programs.

In 1993, a working group of the Federal Coordinating Council for Science, Engineering, and Technology, co-chaired by the EPA and the U.S. Department of Education found a growing interest in environmental education among federal agencies. In addition, the agencies recognized that needs in this area have been exceeding the resources available and that an opportunity exists to coordinate priorities and resources, thereby reducing duplication among the agencies.

Congress affirmed its commitment to education through bipartisan support of the Goals 2000: Educate America Act.[35] The principles underlying Goals 2000 include: the need for high expectations for students; full participation by parents, educators, and communities in education; safe and disciplined learning environments; quality teaching and professional development; effective and coordinated use of technology in learning; systemic reform; and custom-made school improvements. Goals 2000 provides national leadership to enable states and communities to raise academic performance.

The White House Office of Science and Technology Policy, understanding the importance of raising academic standards and aware of the need for educating students about environmental technologies, identified education as a priority policy area of the *National Environmental Technology Strategy*. The *Strategy* calls for an integrated, interdisciplinary education and training system for students at all levels.

The *National Environmental Technology Strategy*, in combination with Goals 2000 and other educational initiatives throughout the federal government, such as initiatives led by the National Aeronautics and Space Administration, Environmental Protection Agency, National Park Service, National Oceanic and Atmospheric Administration, National Science Foundation, Department of Energy, Peace Corps, and others can help ensure that all learners achieve high standards and are knowledgeable about sustainable environmental technologies of the future. We owe all learners nothing less.

INITIATIVE 9.1

Establish a working group within the National Science and Technology Council to devise and coordinate the implementation of broad federal policies for education for sustainability, ensuring an integrated set of federal programs directed to high priority national needs.

In 1993, the National Science and Technology Council (NSTC) was established by President Clinton to coordinate policy development, coordination, and implementation of the $72 billion federal budget dedicated to science and technology. Approximately $6 billion of this budget is earmarked for research and development related to the environment and natural resources, but only a small fraction of these funds are focused on education for sustainability.

The Council ensures that federal funds are directed to national goals—both near- and long-term—and helps federal managers become familiar with related programs in other agencies, ensuring that efforts are not duplicated, and facilitating coordination of similar activities. Two NSTC reports resulting from this effort, *Technology for a Sustainable Future: A Framework for Action* and *Bridge to a Sustainable Future: A National Environmental Technology Strategy*,[36] include discussions and recommendations pertaining to the advancement of

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environmental and sustainability education at the K-12, community college, and university levels.

Of the Council's nine committees, two in particular play a leadership role in advancing education relating to sustainability: the Committee on Environment and Natural Resources and the Committee on Education and Training. The Committee on Environment and Natural Resources provides a mechanism for interagency coordination related to domestic and international environmental and natural resources issues. The Committee on Education and Training works to coordinate and focus federal efforts so that they become a powerful force in helping Americans meet the challenges of the 21st century. This will be accomplished by ensuring that all Americans have access to quality education and training tailored to their individual learning and workplace needs, and achieving exemplary performance that is second to none in science, math, engineering, and technology in American classrooms and workplaces.[27]

A Working Group on Education for Sustainability has been established that builds on the expertise of these two NSTC committees and other education efforts across the government. Priority activities will be developed by the participating federal agencies. The Working Group on Education for Sustainability can guide this coordination, linking and maximizing federal investments in education for sustainability. Agency initiatives in this area must be carefully coordinated if collective action and collaborative partnerships are to become benchmarks of federal leadership.

Additionally, the working group should coordinate its activities with the EPA Task Force on Environmental Education, which was created to advise the EPA on its implementation of the National Environmental Education Act. The broad policy perspective of the National Science and Technology Council's Working Group on Education for Sustainability coupled with the specific mandate of the Federal Task Force on Environmental Education could provide a beneficial 2-pronged approach to education for sustainability across the federal government. Leveraging limited federal resources to spur initiatives in the private sector should be a priority. Ultimately, the working group's efforts should result in an integrated set of federal programs directed to national needs and closely linked to and supportive of private sector, state, and international activities.

INITIATIVE 9.2

Explore ways to coordinate resources, make education for sustainability more central to agency missions, and increase funding of education for sustainability programs and research.

Once coordinated efforts are established among federal agencies to enhance government's capacity for designing, developing, and supporting educational efforts in the area of sustainability, it will be possible to provide technical assistance to federal agencies for maintenance of these programs. Strategic planning and investment in long-range strategies to strengthen efforts in education and evaluate the effectiveness of such investment is not only necessary but is the key to the success of educational programs.

Assistance in identifying needs and responding with strategic programs and materials that tap the strengths of other agencies and partners from the private and nongovernmental sector is greatly needed. Linkages and partnerships that are effective and resourceful—and persist over time—would ensure that the educational community benefits from a coordinated effort to provide responsive programs and services.

State Activities

It is essential that states take the lead in infusing education for sustainability into the classroom. Development of programs related to sustainability varies from state to state and among communities around the country. No one state has incorporated this kind of programming fully into its formal and nonformal educational institutions. A given student may receive an environmental education unit in one or two classes in the early grades, and possibly an environmental studies elective in high school. If students are to develop interdisciplinary, systems-based knowledge of the natural and built environments and the skills to participate actively in developing a sustainable society and economy, education for sustainability should be infused into more subject areas and at all grade levels. It also should be reinforced in postsecondary institutions and outside the walls of the classroom. Fortunately, education leaders in many states are working toward these goals.

Programs and initiatives in many states date back to the 1960s and 1970s. Professionals in the field developed educational frameworks for environmental education, created teaching materials and programs, and conducted research to help facilitate the infusion. In many states, education leaders also worked to pass legislation encouraging the teaching of environmental education. They worked to create positions for environmental education specialists in state education agencies and advanced initiatives for incorporating environmental education across the curriculum.

The challenge today is to encourage and support comprehensive programs that result in learners with a commitment to sustaining ecologically sound and economically prosperous communities, cities, and regions. To date, work has been completed toward outlining the components of a state-level comprehensive environmental education program. "Comprehensive," in this case, refers to a combination of program, structure, and funding components.

The National Environmental Education Advancement Project, (NEEAP) headquartered at the University of Wisconsin-Stevens Point, has been assisting states in their efforts to develop comprehensive programs. NEEAP, with the support of its partners—the U.S. Environmental Protection Agency, North American Association for Environmental Education, National Wildlife Federation, and the National Fish and Wildlife Foundation—provides seed funding, leadership training, consulting services, a clearinghouse, and a quarterly newsletter to individuals interested in strengthening state-level environmental education programs. NEEAP has developed "EE 2000," a project that will assist 20 states by the year 2000 in building comprehensive environmental education programs.

Across the nation only a handful of states have achieved a majority of the components: Maryland, Minnesota, Pennsylvania, and Wisconsin. In addition, at least 30 other states have a few, or at least one, cornerstone component in place. Many of these states, including Arizona, California, Colorado, Florida, Hawaii, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maine, Missouri, North Carolina, Oklahoma, Oregon, South Dakota, Tennessee, Texas, Washington, and Wyoming, have active environmental education associations, committees, or councils that are currently in the process of strengthening their state environmental education programs.

INITIATIVE 9.3

Develop consortia to coordinate, both among states and at the federal level, the infusion of education for sustainability into formal and nonformal educational institutions.

As states design comprehensive programs, moving forward through legislative or administrative channels and public-private partnerships, efforts to coordinate across state lines and with federal agencies are crucial. The formation of state consortia as partners with federal agencies to participate in setting priorities will ensure open lines of communication, consistency, coordination, and accountability.

State consortia will be formed by linking existing and essential networks of public and private entities in each state. The purpose of the consortia will be to integrate research, education, and extension functions in support of sustainable development practices at the community level, and to coordinate with other states in the region and with federal agencies.

Components of State-Level Comprehensive Environmental Education (EE) Programs

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Action 10: Technology and Information

Coordinate or enhance existing essential tools for formal and nonformal environmental and sustainable development education, including multimedia computer and telecommunications technologies and an information clearinghouse.

"Today, we have a dream for a different kind of superhighway that can save lives, create jobs, and give every American young and old, the chance for the best education available to anyone, anywhere. I challenge you . . . to connect all of our classrooms, all of our libraries, and all of our hospitals and clinics by the year 2000."

Al Gore
Vice President of the United States

Finding

Success in advancing education for sustainability programs nationally and globally will depend to a large degree on the extent to which advanced communication systems such as the Internet are used to make information available to teachers, students, and the public. Nationwide, tens of millions of people have access to the Internet. Globally, the rate at which the Internet is being accessed is advancing at lightning speed. The Internet and the associated World Wide Web are highly efficient and cost-effective systems for linking educators, policymakers, students, and parents interested in advancing education for sustainability.

In parallel with the growth of the Internet, the demand for information by way of interactive, multimedia technologies have advanced rapidly in recent years and are projected to continue to grow even faster in the years ahead. In the United States alone, the number of homes containing multimedia personal computers is increasing rapidly. A multitude of products are available commercially and are being used in schools, homes, and workplaces. These include a variety of interactive multimedia products such at CD-ROMs, which allow students to learn about the environment through text, audio, and video images. Educational tools such as these are designed to hold students' interest and encourage creativity while conveying information. Computer-aided environmental education that takes advantage of new interactive multimedia approaches will grow dramatically in the coming decade. Society is being transformed by information and communication technologies, yet the application of this technology in the classroom is lagging. As recently stated by the U.S. Department of Education:

> *"Everywhere we look, technology is changing the way we work and live. Everywhere, that is, but in our classrooms. In an information-age society we have factory era schools. In classrooms that could be modern communication centers for learning, the basic media of instruction continue to be blackboards and chalk. Only a handful of schools have full access to the new technologies that are becoming so central to our lives, and the abundant learning resources available on the information superhighway are out of reach for most of our teachers, students, and parents."*[58]

Studies have demonstrated that students are capable of learning at substantially higher levels than they are achieving at present. Information and communication technologies offer major opportunities for improvement, and these technologies are the key to ensuring a well-trained, highly motivated workforce.

Given the attractiveness of interactive multimedia to students, progress toward sustainability will depend in part on the extent to which modern technologies are employed in disseminating curricula and related education resources. Access to technology is clearly a limiting factor in advancing this field nationally and globally.

In the United States, lack of telephone lines in classrooms is a barrier to teachers' participation in electronic communications networks. The good news is that access to telephone lines and advanced communication devices is improving at a rapid pace. In 1993, approximately one-fourth of U.S. schools had modems.[39] By 1994, those figures inched up to nearly 65 percent in all schools, including 77 percent of all high schools had this technology.[40] Telecommunications systems are advancing rapidly worldwide, and the education community should continue to take advantage of this emerging network to reach millions of individuals and organizations on a global scale.

Equity in access to advanced educational technology will be an important factor as these technologies expand and mature. Ensuring equal access to technology is critical, and resources from both the public and private sectors will be required by educational institution.

"In our GLOBE program, we are studying how to take measurements and send them over the Internet. We have taken temperature readings, soil moisture readings, cloud observations, solid and rain precipitation readings, water temperature and pH readings. The readings show us how the changing weather and seasons affect the everyday events we normally see and ignore, to better understand the environment we live in, is to help better the environment we live in."*

Jason Terry
GLOBE student
Kingsburg High School, Kingsburg, California

*Global Learning and Observations to Benefit the Environment (GLOBE) is an international science and education program coordinating the work of students, teachers, and scientists to study and understand the global environment.

INITIATIVE 10.1

Enhance existing interactive information and communications networks designed to facilitate the exchange of information on education for sustainability through the Internet, linking educators, students, and policymakers globally.

During the past year, thousands of organizations have established Internet World Wide Web "home pages" that allow computer users to access information about a wide range of programs and activities. A home page permits an individual to identify information products and access them instantly. It also facilitates two-way communication and cooperative activities, allowing educators to organize and exchange a wide range of information.

A newly created federal home page for environmental and sustainability education, for example, could facilitate access to information on programs in federal departments and agencies, grant programs, government-supported projects in the private sector, and projects in states and communities, as well as information on educational tools and curricula. Such a home page could be facilitated by the National Science and Technology Council.

INITIATIVE 10.2

Develop, regularly update, and disseminate a videotape or CD-ROM that features the current year's highlights related to successful efforts in education for sustainability, such as partnerships, leaders who have played important roles, curriculum materials, and other information resources.

Programs in education for sustainability are expanding rapidly nationally and internationally, and vast quantities of materials and information on educational

Technology Learning Challenge Offers Partnership Opportunities

In 1994, the Clinton Administration, through the U.S. Department of Education, announced Technology Learning Challenge grants to serve as catalysts for change. The grants support communities of educators, parents, industry partners, and community leaders who are working to craft their schools for the 21st century. The department awards $9.5 million in challenge grants to 19 communities a year. In February 1996, President Clinton announced America's Technology Literacy Challenge, an expanded version that will, if passed by Congress, award $2 billion over five years.

successes, within and outside the classroom, are being developed. Educators need easy access to information that will aid them in teaching. Likewise, at the university level, information on education for sustainability is increasingly in demand as universities build multidisciplinary teaching and research programs in this area.

The advances are so rapid that an annually updated resource, in the form of a "who's who" or national "spotlight" would be useful for educators, students, parents, community leaders, government officials, industry managers, and individuals in nonprofit organizations addressing education for sustainability.

INITIATIVE 10.3

Support coordination of existing clearinghouses to offer collaboratively a primary point of contact for incorporating and disseminating the vast array of information resources on education for sustainability available through print and electronic media.

Information related to education for sustainability is available in a variety of formats—hard copy curricula to multimedia CD-ROMs to "distance learning" activities. Programs include the Educational Resources Information Clearinghouse (ERIC), EE-Link, various compendiums, and on-line networks such as EcoNet. To date, there has not been an effort to coordinate and link existing services through a "one-stop-shop" for the user that identifies all links to any desired end product, whether existing materials, conferences or programs, information for dissemination to the public, or vital linkages between an identified need of a particular student body and a scientist or other expert.

The U.S. Environmental Protection Agency's Environmental Education Division has launched a new effort, the Environmental Education and Training Partnership, which, among other objectives, facilitates partnerships between existing clearinghouses such as ERIC, the Eisenhower Clearinghouse, EE-Link, and services offered by the North American Association for Environmental Education. This program will provide a resource library aimed at improving existing databases of environmental education materials as well as access to such information. Additionally, the Environmental Education and Training Partnership will complete the development of standards for environmental education materials and provide training on methods of evaluation of environmental education materials using existing databases. As part of an effort to explore additional partnerships in this area, the partnership will facilitate a meeting with providers of environmental education databases and clearinghouses.

With the increased use of emerging technologies, information clearinghouses should provide national access through electronic routes such as e-mail and conferencing, as well as traditional communication modes such as a toll-free telephone number, fax, and mail.

A coordinated clearinghouse system is essential in order to provide a comprehensive, user-friendly service. Such a system should encourage critical evaluations so that future needs for information in the field may be identified.

INITIATIVE 10.4

Make greater use of geographic information systems and other databases related to the environment and sustainability in educational curricula.

Geographic information systems (GIS) are essential tools for monitoring natural resources, environmental quality, and modifications of local, regional, national, and global ecosystems. The federal government, states, and private organizations maintain tremendous quantities of data on natural resources and environmental quality. Information is increasingly becoming accessible to users worldwide by way of advanced telecommunications technology. City planners, land use authorities, and others are making use of GIS increasingly in their everyday work.

Students and teachers should be aware of the availability and utility of these systems. Appropriate education courses should familiarize students with the types of databases that exist, the methods for accessing them, and the ways they can be used to monitor environmental change and guide decisions about resource use and environmental protection.

Revitalization of an Urban Neighborhood

To promote revitalization of Detroit's inner city, Cass Technical High School is working with the Urban Environmental Education Resource Center through a program titled "Urban Environmental Education in Detroit" to use geographic information systems (GIS) to help students observe how environmental conditions in their neighborhoods could be improved by using GIS mapping applications.

In collaboration with the University of Michigan's School of Public Health, the students are using GIS applications to map 200,000 homes located in school districts that exceed U.S. Environmental Protection Agency standards for acceptable lead levels in drinking water. Detroit public schools will use this data to compare standardized test scores of elementary school students from neighborhoods that have lead pipes and those that do not.

"We need to do away with textbook education and move toward technological education," says Randall E. Raymond, teacher and director of the Cass High School program. "Using GIS systems that focus the students' learning on their own communities allows them to make valuable contributions to the revitalization and regrowth of their communities."

University of Connecticut

MEMORANDUM

TO: Interested Colleagues

FROM: Chester Arnold and Project team colleagues: Jim Gibbons and Heather Nelson, University of Connecticut Cooperative Extension System

RE: Chester Creek Watershed Project

Many folks across the country continue to struggle with how to implement effective watershed or "ecosystem" projects, and those of us in Connecticut are no exception. However, we feel that our *Tidelands* watershed projects are beginning to demonstrate the potential of the approach that we've been slowly working our way through—an approach based on interdisciplinary natural resource information, public-private partnership, the educational use of geographic information system (GIS) technology, and close collaboration with both local officials and private land owners.

The Chester Creek Watershed Project—our first *Tidelands* project—is a natural resource management initiative demonstrating that nonregulatory public education programs planned and conducted in close cooperation with local residents and officials can effectively protect natural resources and foster environmental stewardship. Through information gathering and a series of public education programs supported by geographic information system (GIS) mapping technology, the Project is providing town residents and decision makers with information and tools that they can use to make better decisions regarding the use and management of their local natural resources.

The Project is an ongoing public/private collaboration between the Town of Chester and a project team from the University of Connecticut Cooperative Extension System, The Nature Conservancy-Connecticut Chapter, and the University of New Haven. The Project began in 1993, supported by a one-year seed grant from the U.S. Environmental Protection Agency Region I; the educational initiatives begun that year, however, are open-ended and will extend into the foreseeable future.

We continue to expand and modify this model in a second *Tidelands* effort and we invite your comments and inquiries. We are interested in helping colleagues in the Land Grant and Sea Grant systems to adapt our approach to their states, and we'd love to talk to you.

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Action 11: Multicultural Perspectives

Emphasize and reflect multicultural perspectives at all levels of formal and nonformal education.

Finding

The demographic composition of our nation's classrooms and communities is becoming more diverse than it has been at any other time in U.S. history. One aspect of this transformation is that students are increasingly children of color while teachers are predominantly white. Many of these children are from immigrant families and, for many, English is not their primary language. Additionally, a significant number of America's children face an array of conditions that affect their ability to learn and succeed in school and life. These conditions include poverty and violence, teen pregnancy, and a rollback of educational and employment opportunities.

Recognition is growing that multicultural approaches to teaching and more inclusive content are needed in all forms of education. Educators in both formal and nonformal programs need special training to teach in settings that are increasingly diverse racially, culturally, and linguistically. Teachers of all ethnic groups can benefit from preparation that assists them in performing effectively in diverse settings. The phrases "environmental justice" and "environmental equity" are relatively new, but the underlying concepts are not. The goal of environmental justice is to ensure that all people, regardless of age, ethnicity, gender, social class, or race are "equally" protected from environmental hazards. Environmental justice expands the notion of environment from natural ecosystems to the landscapes where people live, work, and play.

Several reports over the past 25 years, beginning in 1971 with the annual report of the President's Council on Environmental Quality, describe disparities in environmental impacts by health and demographic groups. In recent years, the environmental justice movement has highlighted the special plight of low-income neighborhoods and communities of color with respect to the inequitable distribution of environmental exposures and risks. In addition, the movement has stressed ways in which information can be used to address these problems at the local level. In the 1980s, grassroots and community action groups began mobilizing to focus attention on the adverse health effects associated with hazardous waste incinerators, landfills, sewage treatment plants, and industrial facilities. Because of the proximity of these facilities to low-income and minority communities, residents in adjacent areas often are disproportionately burdened by the potential health effects created by these facilities, such as nausea, asthma and bronchitis. This problem is coupled with the fact that low-income and minority groups often have limited access to health care.

INITIATIVE 11.1

Increase professional development among teachers who are incorporating education for sustainability in urban and rural settings that are characterized by diverse cultural groups.

The demographic transformation under way in the United States challenges educators to develop relevant and inclusive materials reflective of their communities; new multidimensional pedagogies for working with culturally, economically, and linguistically diverse children and communities; and new inclusive visions of an active multicultural citizenry committed to sustainable communities.

Efforts should be made to assist educators in developing specific competencies for success in teaching education for sustainability in culturally diverse settings. The needed skills include conflict resolution, intercultural communication, and approaches that are sensitive to cultural values and practices in communities.

Environmental Teacher Institute

Since 1993, the U.S. Environmental Protection Agency (EPA) and Morgan State University in Baltimore, Maryland, have teamed up to sponsor the Environmental Teacher Institute, which provides training to educators who teach in settings that are increasingly diverse.

The Institute offers a nontraditional approach to community outreach by empowering teachers from under-represented communities to have a stronger role in environmental decisions affecting their communities. Teachers are recruited from states across the nation. The Institute's objectives are to expose teachers to a variety of environmental issues and discuss methods for bringing the knowledge into the classroom; to familiarize teachers with local environmental justice issues; and to recruit minority and disadvantaged students for environmental jobs and careers.

At each Institute, teachers develop materials and teaching strategies that they can take back to their communities. According to an EPA official, "Ultimately, these teachers will become a part of nationwide communications networks that will disseminate key data about environmental issues and will be helpful in recruiting students to pursue careers in fields related to protecting the environment."

The educational value of this Institute went far beyond the walls of the conference room. The multicultural diversity [of participants and speakers] was a most helpful and interesting aspect of the Institute. It gave me insight to the different ways we may have to use to reach students of varied backgrounds."

Gail Brodnax

Science Teacher, Marksville, Louisiana

INITIATIVE 11.2

Support efforts to introduce all educators and students to the issues and perspectives of the environmental justice movement.

The advent of the environmental justice movement provides an opportunity to nurture an interest in education for sustainability issues among educators. Though many teachers are aware of the environmental justice movement through the media and professional publications, most do not have adequate tools and background information to educate students in the classroom.

The environmental justice movement has spawned a number of community-based educational innovations that could benefit mainstream conceptions and practices. Likewise, these communities could benefit from interaction with traditional environmental educators, who could broaden environmental literacy among members of those communities beyond the specific issues they face.

These community-based multicultural approaches to education for sustainability are supportive of the cultural and linguistic traditions and heritages of diverse peoples. New and innovative examples that are culturally relevant and appropriate abound. They are clearly extensions of what is normally considered education for sustainability.

Harlem Environment Access Project

The Harlem Environment Access Project is an innovative pilot project directed by The New York City Economic Empowerment Zone (NYC EZ). Through the deployment of information technologies and relevant environmental curriculum materials, the Harlem project is intended to empower schoolchildren, teachers, and parents in the NYC EZ to address some of the numerous environmental injustices suffered by this community of 200,000 people, who have a high incidence of poverty. The digital networking of schools provides access to a breadth of intellectual and cultural resources, and enables modes of interaction and communication that were not formerly possible.

The project has several primary goals: to engage students in learning about environmental issues that are relevant to their lives and their community; to provide students with new technologies and new sources of information to assist them in addressing local environmental concerns; and to expose students to the possibilities of careers in environmental science, management and law.

The project connects the information resources and expertise of Columbia University and the Environmental Defense Fund with students and teachers in the NYC EZ. The National Telecommunications and Information Administration is funding the project. Columbia University and the Environmental Defense Fund plan to continue development of project software and content for a period of at least three years following the completion of the 18-month pilot project.

Action 12: Global Perspectives

Continue to expand international linkages for environmental education and education for sustainability.

Finding

Achieving sustainability requires an unprecedented degree of international cooperation, understanding of the global forces that affect human lives, and empowerment of students to be responsible citizens. Education about sustainable development has progressed substantially, primarily through the efforts of individual nations and regions. Many environmental challenges—such as climate change, air pollution, and loss of species—are global in nature. The impacts on human health, livelihoods, and international peace underscore the seriousness of these challenges. Responses must be global in scope and grow out of the cornerstone activities that began in the 1970s in Stockholm and continued in Tbilisi and Belgrade, and in the work of the Brundtland Commission.

The United Nations Conference on the Environment and Development (UNCED), held in Rio de Janeiro in June 1992, led to specific education recommendations. The topics addressed in many, if not all, chapters of *Agenda 21* outline the platform from which education in the future must be launched. *Agenda 21* speaks not only to the need for international cooperation, but also to the necessity of maintaining a global perspective while taking action and responsibility in the context of local communities.

Many countries have embraced the themes of *Agenda 21* as part of their programs in environmental education, global education, and development education. Lessons are being learned and the pace of progress continues on a global scale. In some countries, young people are learning about the workings of global ecological systems and the delicate interconnections between social, environmental and economic systems. To further these advances countries should play an active role to ensure that sustainability themes crosscut curricula at all educational levels.

"One certainty is that the world in which students will live will be increasingly interdependent, marked by accelerating economic, technological, and social change; and driven by an urgent search for patterns of economic and urban development that sustain the environment and its resources."

Jean Perras
Learning for a Sustainable Future

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INITIATIVE 12.1

Educate for global sustainability by: (1) introducing all students to issues raised at the Stockholm and Tbilisi conferences, and by the *Brundtland Report* and *Agenda 21* of the United Nations Conference on Environment and Development (UNCED); (2) sharing sustainability approaches used by other nations, both their successes and challenges, through distance learning and other forms of communication; and (3) exposing students to the responsibilities shared by industrialized and developing countries for providing solutions to environmental, economic and social challenges.

One key to a sustainable future is the realization that we are all citizens of one Earth, dependent on common resources and on one another. Recognizing that major environmental challenges are not limited by political boundaries or geographic lines of demarcation is merely the beginning. A leap forward in present curriculum planning must occur if today's youth are to be prepared to contribute to sustainable development. Education is the vehicle for imparting the knowledge, attitudes, expertise, and values needed by the generations to come.

INITIATIVE 12.2

Support the convening of an international congress on education for sustainability to take place early in the next decade as a catalyst for strategic planning for the remainder of the 21st century.

A conference with a significant voice from youth can serve as the next milestone in the series of actions that have marked the development of education for sustainability. The time has come for a venue where the common ground will be education for sustainability. Educators and consumers from all walks of life should explore the paths being taken to merge environmental, economic, and social themes.

INITIATIVE 12.3

Participate in global partnerships on education for sustainability that build on the progress since the 1972 Stockholm Conference, while being tailored to reach generations of the 21st century.

Specific partnerships and activities that address the needs faced by educators in various regions of the world will strengthen youth's capacity to respond effectively to today's compelling agenda for action. More resources are needed to foster partnership programs. Educational sectors, both formal and nonformal, can benefit from such partnerships, as demonstrated by many of the programs and activities already in operation.

Alliances must be forged to build international linkages among the major organizations involved in global education, development education, and environmental education worldwide. Strategically, this will include calling upon them to identify—on national, regional, and international levels—the primary institutions, organizations, and agencies involved in education for sustainability. Established networks such as the Consortium for International Earth Science Information Network (CIESIN), telecommunications centers, and Internet capabilities can greatly facilitate the exchange of information.

"We don't want to reinvent the wheel, but blindly using educational materials developed elsewhere would reduce the chances of widespread use of the materials in our country."

Meena Raghunathan
Centre for Environment Education, Ahmedabad, India

Global Perspectives, Local Practices

When the World Resources Institute (WRI), a Washington-based policy research institute which focuses on global sustainable development issues, attempted to distribute a new high school curriculum on global issues, Meena Raghunathan responded with the statement above. This is a typical reaction among educators worldwide. But by working with Raghunathan and environmental educators in nine other countries, WRI developed a network of centers that are producing local adaptations of teachers' guides about global issues.

"There are three aspects to dealing with global issues," says WRI education director Mary Paden. "First is the global perspective—taking a worldwide, big-picture look at topics such as biodiversity, climate change, poverty, population, or consumerism. It means looking at data that show conditions and trends as well as regional variations. Second, to be interesting and real, the big picture must be tied to local situations and cultures. Third, is the matter of perspectives. People from different parts of the world have different takes on these issues, and listening to them is highly enriching."

Educators in each country adapt WRI's global curricula units to incorporate local examples and to suit their own educational system's requirements while retaining the global conditions and trends data. As the units are developed, they are shared with other countries. For example, the Indian biodiversity unit was sent to Indonesia.

"There is nothing else like this guide in Mexico," says Margot Aguillar of Grupo de Education Ambientales. "It is in Spanish, has Mexican artwork, was created in Mexico, yet it has a lot of global information that is hard to get in the schools here."

As part of this, international partners like Aguillar, Raghunathan, and other educators will review WRI's next U.S. teacher's guide, *Sustainable Cities*, which will incorporate diverse perspectives with the help of the reviewers, as well as present trends and examples from around the world.

Conclusion

In the first century of the new millennium, the quest for environmental improvement will be framed in terms of science and new technologies, but also will benefit from the wisdom and values espoused by indigenous peoples of the world. Educators and educational systems can respond more vigorously to this global challenge with new methodologies, information technologies, and partnerships on national and international levels.

International cooperation will be key to sharing trends in thinking, research, and pedagogy. Coordination among groups such as the U.N. Educational, Scientific, and Cultural Organization (UNESCO); the International Union for Conservation of Nature and Natural Resources (IUCN) or World Conservation Union; United Nations Development Programme (UNDP); and the United Nations Environment Programme (UNEP) will lead to support for much-needed collaborative relationships among established and emerging environmental and social programs, institutes, and resource centers. Shared research, the articulation of coherent strategies, and common resources accompanied by systematic dissemination of results at a multinational level will add significantly to achieving a desirable and prosperous future.

CHAPTER 4
Examples of Opportunities for Partnerships

Chester Creek Watershed Project
1066 Saybrook Road, Box 70
Haddam, CT 06438-0070
Contact: Chester Arnold
Phone: 860-345-4511
Fax: 860-345-3357
E-mail: carnold@canr1.cag.uconn.edu
WWWeb: http://www.lib.uconn.edu/CANR/ces/npubs.html

The Chester Creek Watershed Project is the first of the Tidelands Watershed Projects on the Tidelands region of the lower Connecticut River. The projects are collaborations between the University of Connecticut Cooperative Extension's Nonpoint Education for Municipal Officials (NEMO) team and The Nature Conservancy. The project is a natural resource management initiative focusing on public education to protect natural resources and foster environmental stewardship.

Consortium for International Earth Science Information Network (CIESIN)
1747 Pennsylvania Avenue, NW, Suite 200
Washington, D.C. 20006
Phone: 202-775-6600
Fax: 202-775-6622
E-mail: ciesin.info@ciesin.org
WWWeb: http://www.ciesin.org

Established in 1989, CIESIN is a nonprofit, nongovernmental organization that provides information to help scientists, decision-makers, and the public better understand our changing world. CIESIN provides on-line access to data, information, and applications used by researchers, decision-makers, and the public to reach a better understanding of how human activity is driving global environmental change.

ECONET
Institute for Global Communications (IGC)
18 De Boom Street
San Francisco, CA 94107
Contact: Anthony Whitworth
Phone: 415-442-0220
Fax: 415-546-1794
E-mail: anthony@econet.apc.org

ECONET is one of five networks operated through the IGC Network. ECONET provides access to a variety of environmentally related home pages, numerous conferences, and resource centers on-line. IGC provides software, frequent updates describing new features on the networks, and technical support.

EE-Link
To access EE-Link's gopher server, the URL server is:
http://www.nceet.snre.umich.edu.

EE-Link is an on-line source of information about environmental education. It provides access to teaching resources on the Internet, including articles, databases, grant information, and instructional materials. EE-Link is funded by the U.S. Environmental Protection Agency as part of the Environmental Education and Training Partnership Program and is housed at the University of Michigan.

Eisenhower National Clearinghouse for Mathematics, Science, and Environmental Education (ENC)

1929 Kenny Road
Columbus, OH 43210-1079
Toll-free telephone: 1-800-621-5785
Phone: 614-292-7784
Fax: 614-292-2066
E-mail: info@enc.org
WWWeb: http://enc.org

The Eisenhower National Clearinghouse for Mathematics and Science Education encourages the adoption and use of K-12 curriculum materials and programs that support state and national efforts to improve teaching and learning in mathematics and science. It provides K-12 teachers with a central source of information on mathematics and science curriculum materials.

Environmental Education and Training Partnership (EETAP)

1255 23rd Street, N.W., Suite 400
Washington, D.C. 20037
Phone: 202-884-8828
Fax: 202-884-8701

The Environmental Education and Training Partnership, funded by the U.S. Environmental Protection Agency, is a three-year endeavor managed and coordinated by the North American Association for Environmental Education. EETAP provides training for teachers and other education professionals, enhances existing environmental education clearinghouses, and facilitates partnerships and networks of education and environmental professionals.

ERIC (Educational Resources Information Clearinghouse)

Office of Education Research and Improvement
Department of Education
Washington, D.C.
Toll-free telephone: 1-800-443-ERIC
WWWeb: http://www.cva.edu/www/eric_ae/ericvil.html

The ERIC system, managed by the U.S. Department of Education, Office of Educational Research and Improvement (OERI), consists of 16 clearinghouses, a number of adjunct clearinghouses, and an ERIC searchable database that contains more than 800,000 records of journal articles, research reports, curriculum and teaching guides, conference papers, and books.

Global Learning and Observations to Benefit the Environment (GLOBE)

744 Jackson Place, NW
Washington, D.C. 20503
Contact: Margaret G. Finarelli
Phone: 202-395-7600
Fax: 202-395-7611
E-mail: mfinarel@globe.gov
WWWeb: http://www.globe.gov

The GLOBE Program is a hands-on program that joins students, educators, and scientists from around the world in studying the global environment. GLOBE's worldwide network of students work under the guidance of GLOBE-trained teachers to make environmental observations, report their data to a GLOBE processing facility, receive and use global images created from their data, and study environmental topics in their classroom.

Global Rivers Environmental Education Network (GREEN)

721 E. Huron Street
Ann Arbor, MI 48104
Contact: Keith Wheeler
Phone: 313-761-8142
Fax: 313-761-4951
E-mail: green@green.org

GREEN is an innovative, action-oriented approach to education, based on an interdisciplinary watershed education model. GREEN's mission is to improve education through a global network that promotes watershed sustainability. Its goals include incorporating all areas of the curriculum and working with schools to develop watershed studies programs; and providing communities with strategies for sustaining these programs.

The Harlem Environmental Access Project

Institute for Learning Technologies
Columbia University Teacher's College
New York, NY 10021
Contact: Robbie McClintock
Phone: 212-678-3375
Fax: 212-678-4048
E-mail:master@ilt.columbia.edu
WWWeb: http://www.ilt.columbia.edu/k12/heap/index.html

The Harlem Environmental Access Project is dedicated to helping school children in five participating schools find solutions to local and global environmental issues.

National Environmental Education Advancement Project

College of Natural Resources
University of Wisconsin-Stevens Point
Stevens Point, WI 54481
Contact: Abby Ruskey
Phone: 715-346-4179
Fax: 715-346-3624
E-mail: neeap@uwspmail.uwsp.edu
WWWeb: http://www.uwsp.edu/cnr/neeap/

The National Environmental Education Advancement Project is a national organization that aids state and local environmental education leaders in promoting their environmental education efforts and develops informational items on building state capacities for environmental education.

Technology Learning Challenge

Interagency Learning Technology Task Force, Suite 6200
U.S. Department of Education
600 Independence Avenue, S.W., Suite 6200
Washington, D.C. 20202
Phone: 202-708-6001
Fax: 202-708-6003

The Technology Learning Challenge is a grant program providing an average of $1 million a year for five years to 19 school systems throughout the country for the purpose of improving education through new learning technologies.

University of Connecticut Cooperative Extension System

College of Agriculture and Natural Resources
Haddam Cooperative Extension Center
1066 Saybrook Road
P.O. Box 70
Haddam, CT 06437
Contact: Chester Arnold
Phone: 203-345-4511
Fax: 203-345-3357
E-mail: carnold@canr1.cag.uconn.edu
WWWeb: http://www.lib.uconn.edu/CANR/ces/nemo1.html

Urban Environmental Education in Detroit

Cass Technical High School
2421 Second Avenue
Detroit, MI 48201
Contact: Randall E. Raymond
Phone: 313-494-2605 x315
Fax: 313-494-2125

The Urban Environmental Education in Detroit program is a nationally and internationally recognized program designed to help urban youth make positive contributions to improve their urban environment.

World Resources Institute (WRI)

1709 New York Avenue, N.W.
Washington, DC 20006
Contact: Mary Paden
Phone: 202-638-6300
Fax: 202-638-0036
E-mail: mary@wri.org
WWWeb: http://www.wri.org/wri

Created in 1982, the World Resources Institute is an independent center for policy research and technical assistance on global environmental and development issues. WRI is dedicated to helping governments and private organizations of all types cope with environmental, resource, and development challenges of global significance.

CHAPTER FIVE

MOVING *forward*

PROGRESS ON THE INFUSION OF EDUCATION FOR SUSTAINABILITY themes into formal and nonformal education programs, businesses, communities and NGOs has been the result of a diverse grassroots movement that has succeeded despite many obstacles. The range and diversity of programs is the movement's strength, but also its weakness. Diversity sometimes results in duplication of efforts, lack of a shared vision, and deprivation of the strength that comes from a common voice. The 1994 "National Forum on Partnerships Supporting Education about the Environment" fostered a dialogue in search of a common vision and consensus on overall goals and priorities. The process of building on that dialogue to develop *An Agenda for Action* has been a goal for this shared vision.

5

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illustration: Rescue Mission Planet Earth

Putting the Agenda into Action

Educational change cannot follow purely from mandates, whether state or federal, although such efforts can be effective as catalysts. Instead, change will emerge from grassroots initiatives, as the history of environmental education clearly demonstrates. Increasingly, the demand for education about the environment is being initiated from students themselves. Adults can add their voices to this call as individuals and, collectively, as members of civic and professional organizations. They can speak out as well in their roles as teachers and professionals, as employees and employers in the business community, and as responsible citizens and civil servants at all levels of government.

A balance between "top-down" and "bottom-up" approaches will be necessary for education for sustainability to realize its full potential. Grassroots activities will continue to drive progress through the bottom-up approach that has characterized the field to date. Government can assist, however, by continuing and improving its coordinating role, and funding innovation and research.

Options for each sector, based on present resources and given current challenges, are discussed in the remainder of this chapter. Potential roles, priorities, and next steps for the major stakeholders are explored. These options represent a snapshot of the collective thinking of the participants in the Forum and the many professionals who have taken part in the subsequent development of *An Agenda for Action*.

The purpose of *An Agenda for Action* is to focus attention on the critical needs of education for sustainability, as they are seen today, and suggest, with a keen eye on the future, strategies for the 21st century for moving forward. Present thinking is evolving, however, and the strategies outlined in *An Agenda for Action* will be reshaped over time in response to unforeseen changes. *An Agenda for Action* is not strategy, "set in concrete," but rather a living document.

The Role of Teachers and Faculty of Higher Education

Educators will be at the forefront in pursuing the actions outlined in the *Agenda*, whether acting as individuals infusing environmental perspectives into their classes or collectively fostering education for sustainability through their educational institutions, professional societies, state infrastructures, and local or national advocacy groups.

As individuals, teachers are responsible for pursuing opportunities for professional training to incorporate the principles of sustainability in their courses. In addition, they can enlist the help of nongovernmental organizations to ensure that their efforts embody diverse cultural perspectives. They can initiate innovations—or

inform themselves about the efforts of others—to bring the business sector and the community at large into the educational experience. They can participate in workshops and seminars that help teachers find appropriate uses for advanced information and communication technologies for teaching about sustainability. They can initiate or replicate successful attempts to make the classroom serve as a model of sustainability for the community.

In all of these activities, teachers and faculty will find allies and willing assistance from higher education, professional societies, the business community, nongovernmental organizations, and state and federal agencies. In turn, they have the formidable responsibility of ensuring that their educational offerings on sustainability consistently meet the highest standards and serve students, parents, and the community.

Professionals in higher education play one of the most decisive roles, that of initiating innovative programs. By finding ways to integrate interdisciplinary and systems approaches in their own undergraduate and graduate courses, they will train a new generation of teachers who will be more effective at inspiring creative thinking and sound decision-making among their students. Through university-level research activities, these professionals can break down the barriers between disciplines and enliven their own teaching as a side benefit. They will benefit by searching out every opportunity to engage their colleagues from other disciplines in their research and teaching activities.

The Role of Individuals

One of the effective ways individuals can contribute to sustainability is by investing time and resources in educating themselves about the complex environmental and natural resources issues that affect their lives each day. Individuals of all ages can participate in and build on many of the initiatives in *An Agenda for Action* through self-awareness, education, and information exchanges with friends, family, and colleagues. Success in educating others for sustainability depends greatly on individual initiative.

Thousands of Americans are already committed to sustainability, but many still lack awareness and accurate information. Individual roles include empowerment through increasing knowledge, skills, and changing attitudes. Roles as consumers are especially important to sustainability in terms of individual action, but equally crucial is collective action through partnering with schools as parents, alumnae, and as members of community and civic organizations.

Commitment to lifelong learning is a way for individuals to gain the knowledge necessary to make informed decisions in their personal and professional lives. They can enroll in adult education classes at their local community college or accompany their children on the next school field trip. They can encourage their employers to work collaboratively with youth as mentors, or ask employers to help expand the work of a local community group that is restoring rivers and streams. There are literally hundreds of actions individuals can take to educate themselves and help advance sustainability.

The Role of Nongovernmental Organizations

Nongovernmental organizations (NGOs) play a critical role in advancing education for sustainability through research, publications, training, service efforts for their members and clients, funding, and community outreach activities. Although some NGOs can maximize their impacts and minimize organizational costs by focusing their efforts at the national level, others can be most effective and influential in their local communities or home states. For example, the Environmental Defense Fund, Columbia University, and the Countee Cullen Library in the New York City Empowerment Zone drew on each institution's expertise to implement a program based on information technology to educate inner city children and their teachers about environmental impacts that affect their community.

The next steps for NGOs include helping educators define standards and identify ways to support existing standards in science, mathematics, and geography education. In addition, they can develop materials for lifelong learning in cooperation with nonformal and formal education venues. NGOs are in a position to set the stage and lead the way for collaborative alliances and initiatives, based on the lessons they have learned in delivering effective and long-lasting programs. The American Forum on Global Education, for example, houses the Sustainability Education Center. Its mission is to promote the concept of sustainability in educational environments by using collaborative programs, research, and materials development as vehicles.

Local community organizations also can play an important role in maximizing the strengths of the numerous stakeholders they serve. They can tap into the cultural viewpoints and norms, business and industry expertise, and the vibrancy of religious communities.

The Role of Professional Organizations

Historically, professional organizations such as the National Science Teachers Association and the North American Association for Environmental Education have played a central role in the evolution of environmental education. Specialized professional and research organizations, such as the Center for Science, Mathematics and Engineering Education, the Global Change Research Program, and the National Council for Geographic Education, as well as related professional groups, such as the American Association of Engineering Societies, have established committees or task forces that focus on sustainability and the environment. Other national efforts include the National Consortium for Environmental Education and Training, the Environmental Education and Training Program, the Global Network of Environmental Education Centers, and the National Environmental Education Advancement Project.

In addition to convening national conferences and seminars on education for sustainability, professional organizations disseminate information on topics pertaining to the environment and distribute educational publications, newsletters, curriculum guides, and creative teaching aids. Professional groups also offer technical assistance to teachers and provide reference assistance, as well as conduct training programs and workshops. These organizations bring together professionals who might otherwise have limited direct contact, such as elementary school and secondary school teachers, and practicing professionals in various fields of expertise. Above all, they promote education at all levels and work to enhance the status, quality, and effectiveness of methods of teaching about the complex relationships of economics, social conditions, and the environment.

Each of these organizations, in addition to working individually to support education for sustainability, can increase their nationwide impact by expanding their partnerships. A coalition speaking with one voice on issues such as the need for professional pre-service and in-service sustainability training for teachers would be very influential. A coalition also could work to encourage adoption of the materials and learner outcome standards being developed by the North American Association for Environmental Education.

Such a coalition could work with the existing organized labor infrastructure to promote vocational training for jobs related to sustainability. The coalition also could collaborate with labor and businesses to expand opportunities for retraining workers displaced as resource-intensive industries downsize, and improve on-the-job upgrading of skills that workers need in order to deploy sustainable production practices that save energy and raw materials.

The Role of Youth

The tools needed to breathe life into *An Agenda for Action* include vitality, enthusiasm, the courage to tolerate change, and a healthy sense of adventure. In short—youth are a very important part of the process.

Leaders from business, government, nongovernmental organizations, and academia are forging new initiatives to educate citizens about what it takes to live sustainable lives. Involving young people in this process from the beginning is essential to insure their ownership and partnership as new policies, practices, and activities are developed.

The economic and social viability of our nation's communities are dependent on youth. Young people generate billions of dollars in annual consumer revenues. In addition, they are actively involved in activities in a number of economic sectors such as sports and recreation, religious institutions, local libraries, and community-based youth organizations. Moving forward with *An Agenda for Action* with the vision and cooperative energy of today's youth is an important step. Bringing together youth and leaders of the adult community is essential to generating partnerships and trust.

The Role of the Business Community

Companies and corporations have a direct interest in the quality of our nation's educational system because the students of today are the workforce of tomorrow. Employees who are trained in the principles of sustainability, for example, are in a position to positively influence the production processes of their companies to conserve energy and minimize waste of raw materials.

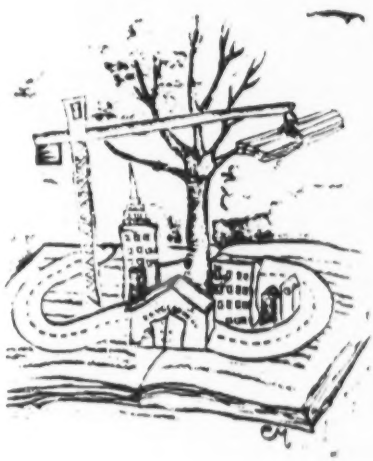
Businesses bring a number of resources to the table, from financial support to technical skills and research. As companies select issues to address, they should weigh their interests, define the nature of their involvement, and decide which arenas to work in—whether local, state, regional, national, or international.

The result of these deliberations might be a decision, for example, to help young people explore their future careers, whether through mentoring programs, internships, or school-to-work opportunities that enable students to experience a variety of occupations. The environmental technology industry has a particular responsibility to encourage careers in environmental fields. Through professional societies, this industry should work with the schools to find ways to invite environmental professionals into the classrooms as guest teachers and students into the business environment to observe how employees tackle real-world problems.

Businesses can take steps to incorporate the principles of industrial ecology into their operations and encourage on-the-job training in sustainable production processes. In doing so, they will be in good standing with the community for their environmental record, while at the same time reduce their economic costs.

Numerous companies are providing support to formal and nonformal education. Part of that commitment is ensuring that their dollars are spent efficiently. Business can participate in curricular development activities with business schools, universities, and engineering schools to ensure that educational programs meet the needs of the business community. Even publicizing business's own successes in introducing sustainable practices is an important educational effort that will help the nation move forward on the path to sustainability.

As with the other sectors, businesses can work individually or collectively. Just as the health care industry has stepped forward to educate the public on the relationship between health and the environment, the forest industry has taken it upon itself to introduce sustainable forestry practices and invite the public to grade its efforts. Likewise, *An Agenda for Action* challenges the advertising community to take the lead in finding ways to educate the public about sustainability and lend its marketing expertise to promote sound education programs, nationally and at the local level.



"Show me a person who understands the wise use of resources—capital, labor, and the environment—and I will show you a business leader of the future."

Samuel C. Johnson
SC Johnson Wax

illustration: Rescue Mission Planet Earth

The Role of America's Communities

A community is only as strong as the citizens who live in it. Forward-looking communities recognize that it is up to them to encourage new economic opportunities and ensure that local schools are training a workforce that will be prepared for new jobs in a changing world. A community working through school districts, local government, and nonprofit civic organizations can create opportunities for formal and nonformal learning that will prepare its citizens for a sustainable future.

The single most important step is to initiate a serious long-term planning process that begins with envisioning sustainable practices appropriate to local conditions. Civic leaders have a responsibility to inform themselves about successful community and neighborhood projects. A number of these projects are highlighted in this document and in the two reports produced by the Public Linkage, Dialogue, and Education Task Force and the Sustainable Communities Task Force of the President's Council on Sustainable Development.

Local governments and civic groups can reach out to business and academic communities for assistance. In other words, municipal governments and local community organizations should serve as catalysts for initiating partnerships and helping build consensus on the need to infuse the principles of sustainability into the educational curricula of local schools. In addition, civic groups in particular should seek out opportunities to engage their members actively in the classroom as mentors and project leaders

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Illustration: Rescue Mission Planet Earth

The Role of the States

Education for sustainability requires active state leadership. Many states prefer to adopt a decentralized approach to achieving sustainability. But for those states that have a formal structure, such as an advisory council and a state coordinator for environmental education, it would be appropriate to play a leadership role in advancing education for sustainability. One option is to take legislative steps to further the initiatives; which implies a responsibility for ensuring that the resulting programs are adequately funded. States also can enlist the private sector's assistance in supporting these activities.

In addition, states can provide technical assistance, adoption or promotion of curriculum standards, assistance with professional development to enhance educators' preparation for teaching sustainability, adoption of teacher certification standards, support of multicultural training for teachers, and assistance with community visioning processes. Many states already are working actively to develop statewide plans for sustainability that include encouraging local planning.

Finally, state actions also can be crucial in linking communities and school districts with federal agencies that can provide assistance.

"Education about the environment can best be accomplished through the cooperative efforts of diverse groups. The very nature of bringing diverse groups together—the parts—emphasizes the strength derived from the whole system. As we look to the future and the challenges we will face, we will need the wisdom that only the whole system can provide us."

Kristina Allen

Arizona State Education Agency Representative to the U.S. EPA

The Role of the Financial Community

The financial community— individual and institutional investors, banks, and international financial institutions—will play a key role in funding educational activities. Advancing education for sustainability in the years ahead will require careful planning, vision, and commitment of leaders from the public and private sectors. Implementing some of the initiatives presented in *An Agenda for Action* could prove to be smart investments. The publication and dissemination of educational materials, for example, has long been a profitable industry in the United States and abroad. The development and commercialization of educational technologies, including computers and telecommunications devices, is a thriving industry worldwide. Institutions such as the World Bank and other development banks can influence the direction and level of effort devoted to education for sustainability activities.

Perhaps the greatest challenge is finding novel ways to attract investors to this important activity. In October 1995, the World Bank convened a major conference on financing for sustainable development. Dialogues such as this are key to directing the talent and resources of the financial community

The Role of Foundations

Historically, nongovernmental organizations have relied on the support of public and private foundations to help finance work for the environment and education. Today, public sources of funding are diminishing, while the number of organizations seeking money is growing. It is therefore increasingly important that foundations participate in the national dialogue on goals and priorities for education for sustainability. Foundations, as stakeholders in this process, are ideally positioned to facilitate a broad, comprehensive approach to sustainability by raising awareness about the interdependence of economic, social, and environmental issues.

The Role of the Federal Government

The federal government should work closely with state and local governments and the private sector to catalyze and coordinate national and international activities. The departments of Agriculture, Commerce, Defense, Energy, Interior, Labor, Environmental Protection Agency, National Science Foundation, and others, have programs addressing the environment and various aspects of sustainability. Helping the nation articulate its near- and long-term educational needs is an important role for departments and agencies throughout the federal government.

The federal government should work to ensure that limited federal funds are carefully targeted toward high-priority national needs and that department and agency efforts are not duplicative. The National Science and Technology Council can aid in coordinating federal activities throughout the Executive Branch and help communicate related programs and priorities to the Legislative Branch.

The federal government also serves as a source of information about the environment and education. Using telecommunications technologies, federal agencies can provide the public with easy access to a wealth of information. The federal government's role in advancing education for sustainability will undoubtedly evolve in the years ahead. Regardless of new directions, the policies and programs of departments and agencies will strongly influence the capacity of the nation to maintain and improve its standard of living while protecting resources for future generations.

The Role of the International Community

International action in the field of education for sustainability has risen steadily since the 1970s. Without question, the call to action has been delivered, and response has come from numerous international groups. The United Nations organizations that participated in the 1972 U.N. Conference on the Human Environment in Stockholm were among the first to respond. The call was clearly repeated in a 1988 U.N. document titled *An International Strategy for Action in the Field of Environmental Education and Training for the 1990s.*[1]

The challenge facing the international community is to maintain open lines of communication and evaluate policies in an integrated fashion. Only then can it reach all people to promote approaches that integrate social, economic, and environmental policies. Efforts emerging from this base of communication can be directly applied to the advancement of skills, knowledge, and practice worldwide.

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CHAPTER 5
Examples of Opportunities for Partnerships

American Forum for Global Education
120 Wall Street, Suite 2600
New York, NY 10005
Contact: Tom Keehne
Phone: 212-742-8232
Fax: 212-742-8752
E-mail: globed@igc.org
WWWeb: http://www.globaled.org

The American Forum for Global Education is a private, nonprofit organization dedicated to promoting the education of our nation's youth for responsible citizenship in an increasingly interconnected and rapidly changing world.

Global Network of Environmental Education Centers (GNEEC)
601 South Concord Street, Suite LLA
Knoxville, TN 37919
Contact: John Paulk
Phone: 615-525-6262
Fax: 615-525-6442

The Global Network of Environmental Education Centers is a network of organizations worldwide, whose mission is to provide opportunities and resources for member centers to participate in joint environmental education programming at all levels; to unify environmental education centers under a collective voice; and to strengthen and develop environmental education as a recognized and respected international institution.

U.S. Environmental Protection Agency Environmental Education Division
401 M Street, S.W.
Washington, D.C. 20460
Contact: C. Michael Baker
Phone: 202-260-4965
Fax: 202-260-4095

The National Environmental Education Act of 1990 charged the EPA with the responsibility of providing leadership at a national level to improve environmental literacy—the Act establishes various programs—grants, teacher training, internship and youth award programs.

conclusion: a crossroad

"Even the most casual reading of the Earth's vital signs immediately reveals a planet under stress. In almost all the natural domains, the Earth is under stress—it is a planet that is in need of intensive care. Can the United States and the American people, pioneer sustainable patterns of consumption and lifestyle, (and) can you educate for that? This is a challenge that we would like to put out to you."

Noel J. Brown
Regional Office for North America
United Nations Environment Programme
National Forum on Education about the Environment October 1994

THE CONVERGENCE OF A NUMBER OF TRENDS AND EVENTS in recent years suggests that a unique opportunity to advance education for sustainability has arrived. On the one hand, the field is benefiting from increased attention from professional societies, continued surges of public concern over local and national and international environmental issues, and ongoing engagement by nongovernmental organizations and federal agencies. In addition, the impetus provided by the Earth Summit, the National Science and Technology Council, and the President's Council on Sustainable Development is catalyzing increased public attention to education for sustainability. This trend is fostering interdisciplinary linkages among the natural and social sciences. Achieving a sustainable future will not happen unless our educational system graduates citizens and specialists who understand the interconnections among the environmental, economic, and social disciplines.

Today, education for sustainability is positioned to enter the national stage as a priority for the coming decade. Taken together, the initiatives and framework laid out in *An Agenda for Action* offer a starting point. The hope is that the *Agenda* will stimulate further dialogue and action on these initiatives.

The overarching goal is to infuse the concepts of sustainability into all learning from structured schooling in formal education settings to lifelong learning in nonformal programs. Education for sustainability can help prepare our society for a fast-paced world of rapid scientific, social, technological, workforce, and demographic changes.

Increasingly, citizens young and old are flooded with information. On the Internet, for example, they can find information about global-scale environmental changes like global warming, loss of biodiversity, and the ozone hole; how human activities contribute to these changes, how they are inter-related and how they affect ecosystems and human health. The most up-to-date scientific information is more readily available than ever before. The key question, however, is whether citizens will be able to understand how to use this information. Education is a vehicle that can ensure that technology and the capacity to use information are available to everyone.

Education is our bridge from the past to the present and from the present to the future. A deep recognition of the importance of education is the necessary first step if we are to achieve the level of democratic participation envisioned by this country. Infusing the concepts of sustainability throughout learning experiences will help foster that awareness. Involvement of educators, government, businesses, and nongovernmental organizations working toward common goals will lead to an understanding of multiple perspectives and informed decision-making.

How we meet the future is in our hands. Education for sustainability provides an opportunity to craft the future we want for a sustainable America.

endnotes

Introduction

1 United Nations Conference on Environment and Development (UNCED), *Agenda 21: Programme of Action for Sustainable Development* (New York: United Nations, 1992).

Chapter One

2 The World Commission on Environment and Development (Brundtland Commission), *Our Common Future* (Oxford: Oxford University Press, 1987), p.43.

3 The President's Council on Sustainable Development, *Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment* (Washington, DC: Government Printing Office, 1996).

4 The term *education for sustainability* or *sustainability education* complements a number of other fields such as environmental education, global education, economics education, development education, multicultural education, conservation education, outdoor education, global change education, and others. Education for sustainability is considerably broader and encompasses many aspects of these respected and established fields of study.

5 Definitions of environmental education have been presented in the following documents: U.N. Educational, Scientific, and Cultural Organization (UNESCO), *Belgrade Charter* (Belgrade, Yugoslavia, 1975); *Final Report, Intergovernmental Conference on Environmental Education* (Tbilisi, USSR, 1977); The World Commission on Environment and Development (Brundtland Commission), *Our Common Future* (Oxford: Oxford University Press, 1987); North American Association for Environmental Education (NAAEE), *Defining Environmental Education: The NAAEE Perspective*, Unpublished paper, 1983; United Nations Conference on Environment and Development (UNCED), *Agenda 21: Programme of Action for Sustainable Development* (New York: United Nations, 1992); International Council for Adult Education, *7 Year Plan for Major Institutional Change, Phase II, 1996;* National Archives, *Memorandum of Understanding on Environmental Education among the Department of the Environment Canada and the Secretariat of Social Development Republic of Mexico and the Environmental Protection Agency*, U.S. Environmental Protection Agency (Washington, DC: 1992).

6 Carnegie-Mellon University study cited by Susan Cohen, "The Warm Zone," *The Washington Post Magazine*, July 1995.

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